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Appendix A

Glossary of Terms

Appendix A: Glossary of Terms

1. ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
ADA	Americans with Disabilities Act
AFB	Air Force Base
AHPA	Archaeological and Historic Preservation Act
ARPA	Archaeological Resources Protection Act
BCC	Birds of Conservation Concern
BOD	biological oxygen demand
BRT	Biological Review Team
CCP	Comprehensive Conservation Plan
CFR	Code of Federal Regulations
cfs	cubic feet per second
cfu	colony-forming units
dB	decibel
DDT	Dichlorodiphenyltrichloroethane
DEA	Draft Environmental Assessment
DEIS	Draft Environmental Impact Statement
DoA	Department of the Army
DOI	Department of the Interior
DOT	Washington State Department of Transportation
DPS	Distinct Population Segment
DU	Ducks Unlimited
EA	Environmental Assessment
EE	environmental education
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	evolutionary significant unit
FR	Federal Register
FTE	full-time equivalent
FWS	U.S. Fish and Wildlife Service (also, Service)
FY	Fiscal Year
GIS	Global Information System
GMA	Growth Management Act
GPS	Global Positioning System
HABS/HAER	Historic American Building Survey/Historic American Engineering Record
HB	House Bill
HUD	Housing and Urban Development
I-5	Interstate 5
Improvement Act	National Wildlife Refuge System Improvement Act of 1997
MHHW	mean higher high water
MHW	mean high water
MLLW	mean low low water
MOU	Memorandum of Understanding

mph	miles per hour
NA	Nisqually Agriculture (zoning designation)
NAGPRA	Native American Graves Protection and Repatriation Act
NGOs	non-government organizations
NEPA	National Environmental Policy Act
NGDV	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NMML	National Marine Mammal Laboratory
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRHP	National Register of Historic Places
NRTF	Nisqually River Task Force
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
OAHP	Office of Archaeology and Historic Preservation
OFM	Washington Office of Financial Management
ORV	off-road vehicle
PCBs	polychlorinated biphenyls
PDR	Purchase of Development Rights
PGFSPDC	Ad-Hoc Pacific Groundfish Fishery Strategic Plan Development Committee
PHS	Priority Habitats and Species
ppt	parts per thousand
PRISM	Program for Regional and International Shorebird Monitoring
PSRC	Puget Sound Regional Council
PUNA	Public Use Natural Area
PWC	personal watercraft
RA	Research Activity Management
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RNA	Research Natural Area
ROD	Record of Decision
RONS	Refuge Operating Needs System
SEPA	State Environmental Policy Act
Service	U.S. Fish and Wildlife Service (also, FWS)
SHB	State House Bill
SHPO	State Historic Preservation Office
SoC	Species of Concern
SPI	Superintendent of Public Instruction
SUP	Special Use Permit
TES	Threatened and Endangered Species
TM	Thematic Mapper
TNC	The Nature Conservancy
UGA	Urban Growth Area
USC	United States Code
USDA	U.S. Department of Agriculture
WAC	Washington Administrative Code

WDFW
WDNR
WNHP
WRIA
YCC

Washington Department of Fish and Wildlife
Washington Department of Natural Resources
Washington Natural Heritage Program
Water Resource Inventory Area
Youth Conservation Corps

2. GLOSSARY OF TERMS

Achievement Strategy. See Strategy.

Adaptive Management. Refers to a process in which policy decisions are implemented within a framework of scientifically driven experiments to test predictions and assumptions inherent in management plan. Analysis of results help managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.

Alluvial. Sediment transported and deposited in a delta or riverbed by flowing water.

Alternative. 1. A reasonable way to fix the identified problem or satisfy the stated need (40 CFR 1500.2). 2. Alternatives are different means of accomplishing refuge purposes and goals and contributing to the System mission (draft Service Manual 602 FW 1.5).

Amphipod. Any of a large order of small, usually aquatic crustaceans with a laterally compressed body (for example, beach fleas).

Anadromous. Migratory fishes that spend most of their lives in the sea and migrate to fresh water to breed.

Basin. A region drained by a river system.

Benthic. Refers to organisms associated with the bottom of the sea, lake, or river.

Biological Diversity. The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (USFWS Manual 052 FW 1. 12B). The System's focus is on indigenous species, biotic communities, and ecological processes. Also referred to as Biodiversity.

Bivalve. Common term for pelecypods, members of the Mollusca in which the hard parts are composed of 2 sections fitting together to enclose a space that contains the soft part of the organism.

Brown Farm Dike. The approximately 5-mile long dike that was built in the late 1800s and early 1900s to convert salt marsh areas into farmland by preventing saltwater inundation.

Carrying Capacity. The maximum population of a species able to be supported by a habitat or area.

Categorical Exclusion. A category of actions that do not individually or cumulatively have a significant effect on the human environment and have been found to have no such effect in procedures adopted by a Federal agency pursuant to the National Environmental Policy Act (40 CFR 1508.4).

Class A Noxious Weed. Those noxious weeds not native to the state that are of limited distribution or are unrecorded in the state and that pose a serious threat to the state.

Class B Noxious Weed. Those noxious weeds not native to the state that are of limited distribution or are unrecorded in a region of the state and that pose a serious threat to that region.

Class C Noxious Weed. Any other noxious weed.

Compatible Use. A wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the Mission of the System or the purposes of the refuge (Draft Service Manual 603 FW 3.6). A compatibility determination supports the selection of compatible uses and identifies stipulations or limits necessary to ensure compatibility.

Comprehensive Conservation Plan (CCP). A document that describes the desired future conditions of the refuge, and provides long-range guidance and management direction for the refuge manager to accomplish the purposes of the refuge, contribute to the mission of the System, and to meet other relevant mandates (Draft Service Manual 602 FW 1.5).

Concern. See definition of “Issue.”

Cover Type. The present vegetation of an area.

Cultural Resources. The remains of sites, structures, or objects used by people in the past.

Cultural Resource Inventory. A professionally conducted study designed to locate and evaluate evidence of cultural resources present within a defined geographic area. Inventories may involve various levels, including background literature search, comprehensive field examination to identify all exposed physical manifestations of cultural resources, or sample inventory to project site distribution and density over a larger area. Evaluation of identified cultural resources to determine eligibility for the National Register follows the criteria found in 36 CFR 60.4 (Service Manual 614 FW 1.7).

Delta. The alluvial deposit at the mouth of a river.

Demersal. Organisms living at or near the bottom of a sea or lake but having the capacity for active swimming.

Disturbance. Significant alteration of habitat structure or composition. May be natural (e.g., fire) or human-caused events (e.g., aircraft overflight).

Ecosystem. A dynamic and interrelating complex of plant and animal communities and their associated non-living environment.

Ecosystem Management. Management of natural resources using system-wide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native habitats and basic ecosystem processes are perpetuated indefinitely.

Endangered Species (Federal). A plant or animal species listed under the Endangered Species Act that is in danger of extinction throughout all or a significant portion of its range.

Endangered Species (State). A plant or animal species in danger of becoming extinct or extirpated in Washington within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.

Environmental Assessment (EA). A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action, alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

Environmental Impact Statement (EIS). A detailed written statement required by section 102(2)(C) of the National Environmental Policy Act, analyzing the environmental impacts of a proposed action, adverse effects of the project that cannot be avoided, alternative courses of action, short-term uses of the environment versus the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitment of resources (40 CFR 1508.11).

Epibenthic. Pertaining to the environment and conditions of organisms living near the water bottom.

Estuarine. Deepwater tidal habitats and adjacent tidal wetlands that are usually partly enclosed by land but have some access to the open ocean and are diluted by freshwater.

Estuary. The wide lower course of a river into which the tides flow. The area where the tide meets a river current.

Euryhaline. Organisms that are tolerant of a wide range of salinity.

Finding of No Significant Impact (FONSI). A document prepared in compliance with the National Environmental Policy Act, supported by an environmental assessment, that briefly presents why a Federal action will have no significant effect on the human environment and for which an environmental impact statement, therefore, will not be prepared (40 CFR 1508.13).

Forb. A broad-leaved, herbaceous plant; for example, a columbine.

Gastropod. Any of a large class of mollusks, usually with a univalve shell or no shell and a distinct head bearing sensory organs, such as snails and slugs.

Gill Net. A type of fishing net utilized by commercial, tribal, and occasionally recreational fishing operations. These nets are the center of much controversy due to the high incidence of by-catch associated with their use.

Goal. Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (Draft Service Manual 620 FW 1.5).

Habitat. Suite of existing environmental conditions required by an organism for survival and reproduction. The place where an organism typically lives.

Habitat Type. See Vegetation Type.

Habitat Restoration. Management emphasis designed to move ecosystems to desired conditions and processes, and/or to healthy ecosystems.

Improvement Act. The National Wildlife Refuge System Improvement Act of 1997.

Intergrade. An individual occurring on the boundary between adjacent subspecies and which possesses intermediate characters or traits.

Introgression. The spread of genes of one population into the gene pool of another by hybridization and backcrossing.

Inversion. A state in which the temperature of the air increases with increasing altitude and keeps the surface air and pollutants down.

Issue. Any unsettled matter that requires a management decision (e.g., a Service initiative, opportunity, resource management problem, a threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition) (Draft Service Manual 602FW 1.5).

Lacustrine. Pertaining to, or living in, lakes or ponds.

Landbird. A category of birds that obtains at least part of their food from the land and nest in mainland areas (though some can also be found on islands). Landbirds include raptors and songbirds among others.

Management Alternative. See Alternative.

Migration. The seasonal movement from one area to another and back.

Minimal Critical Staffing. The core staffing needed at Nisqually NWR to meet minimum resource needs, approved by the Service pre-CCP.

Mission Statement. Succinct statement of a unit's purpose and reason for being.

Monitoring. The process of collecting information to track changes of selected parameters over time.

Mysids. A group of crustaceans, also known as opossum shrimps, that feed upon small zooplankton.

National Environmental Policy Act of 1969 (NEPA). Requires all Federal agencies, including the Service, to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Federal agencies must integrate NEPA with other planning requirements, and prepare appropriate NEPA documents to facilitate better environmental decision making (from 40 CFR 1500).

National Wildlife Refuge. A designated area of land, water, or an interest in land or water within the System.

National Wildlife Refuge System. Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife, including species threatened with extinction; all lands, waters, and interests therein administered by the Secretary as wildlife refuges; areas for the protection and conservation of fish and wildlife that are threatened with extinction; wildlife ranges; games ranges; wildlife management areas; or waterfowl production areas.

National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57). Under the Refuge Improvement Act, the U.S. Fish and Wildlife Service is required to develop 15-year Comprehensive Conservation Plans for all National Wildlife Refuges outside Alaska. The Act also describes the six public uses given priority status within the NWRS (i.e., hunting, fishing, wildlife observation, photography, environmental education, and interpretation).

National Wildlife Refuge System Mission. The mission is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Native Species. Species that normally live and thrive in a particular ecosystem.

Nematodes. Non-segmented roundworms of the phylum Nematoda. They range widely in size and can be free-living or parasitic.

Neritic. Pertaining to the marine zone between low tides and the edge of the continental shelf, a depth of roughly 200 m. A neritic environment supports marine organisms, also described as neritic, that are capable of surviving in shallow water with moderate exposure to sunlight.

Nisqually Reach. Portion of south Puget Sound extending northwest from DuPont Wharf, including Nisqually River delta, to the southern end of Case Inlet at Johnson Point.

Nisqually River Dike. The portion of the Brown Farm Dike that is located along the Nisqually River.

Noxious Weed. A plant species designated by Federal or State law as generally possessing one or more of the following characteristics: aggressive or difficult to manage; parasitic; a carrier or host of serious insect or disease; or non-native, new, or not common to the United States, according to the Federal Noxious Weed Act (PL 93-639), a noxious weed is one that causes disease or had adverse effects on man or his environment and therefore is detrimental to the agriculture and commerce of the United States and to the public health.

Objective. An objective is a concise target statement of what will be achieved, how much will be achieved, when and where it will be achieved, and who is responsible for the work. Objectives are derived from goals and provide the basis for determining management strategies. Objectives should be attainable and time-specific and should be stated quantitatively to the extent possible. If objectives cannot be stated quantitatively, they may be stated qualitatively (Draft Service Manual 602 FW 1.5).

Obligate Species. Species that require a specific habitat type or plant species for their existence.

Oligohaline. Pertaining to water having low salinity, 0.5-3 ppt for brackish or 17-30 ppt for sea water.

Opisthobranchs. Members of a subclass of gastropods containing such groups as the sea hares and nudibranchs.

Palustrine. Freshwater wetlands that are less than 2 meters deep at low water. They do not include areas regularly impacted by waves or part of a bedrock shoreline. They are familiarly known as marshes, swamps, bogs, wet meadows, prairies, and small shallow ponds.

Passerines. See songbirds.

Pelagic. Referring to organisms that inhabit open waters of the oceans or large lakes.

Personal Watercraft. Personal watercraft (PWC) are small vessels that use inboard motors powering water jet pumps. They are known by such trade names as Jet-ski, Waverunner, and Sea-Doo. Personal watercraft are high performance vessels, designed for speed and maneuverability and are often used to perform stunts. They typically have loud 50 - 100 horsepower engines and are capable of traveling more than 60 mph.

Pinniped. A suborder of carnivores that are marine mammals, have flippers, and eat mostly fish and marine invertebrates (e.g., sea lions, seals).

Plant Association. A classification of plant communities based on the similarity in dominants of all layers of vascular species in a climax community.

Plant Community. An assemblage of plant species unique in its composition; occurs in particular locations under particular influences; a reflection or integration of the environmental influences on the site such as soils, temperature, elevation, solar radiation, slope, aspect, and rainfall; denotes a general kind of climax plant community (e.g., Sitka spruce).

Polychaetes. Any of a class (Polychaeta) of chiefly marine annelid worms (such as clam worms), usually with paired segmental appendages, separate sexes, and a free-swimming trochophore larva.

Preferred Alternative. This is the alternative determined [by the decision maker] to best achieve the Refuge purpose, vision, and goals; contributes to the Refuge System mission, addresses the significant issues; and is consistent with principles of sound fish and wildlife management.

Priority Species. Fish and wildlife species that the Washington Department of Fish and Wildlife believe require protective measures and/or management guidelines to ensure their perpetuation. Priority species include the following: (1) State-listed and candidate species; (2) species or groups of animals susceptible to significant population declines within a specific area or statewide by virtue of their inclination to aggregate (e.g., seabird colonies); and (3) species of recreation, commercial, and/or tribal importance.

Public. Individuals, organizations, and groups; officials of Federal, State, and local government agencies; Indian tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have indicated an interest in Service issues and those who do or do not realize that Service decisions may affect them.

Purpose(s) of the Refuge. The purpose of a refuge is specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorization, or expanding a refuge, refuge unit, or refuge subunit.

Raptor. A category of carnivorous birds, most of which have heavy, sharp beaks, strong talons, and take live prey (e.g., peregrine falcon, bald eagle).

Refuge Goal. See Goal.

Refuge Purposes. The purposes specified in or derived from the law, proclamation, executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, a refuge unit, or refuge subunit (Draft Service Manual 602 EW 1.5).

Rhizomes. A rootlike stem growing horizontally below the surface. The rhizome is used for food storage and can produce roots and shoots.

Riparian. Refers to an area or habitat that is transitional from terrestrial to aquatic ecosystems; including streams, lakes wet areas, and adjacent plant communities and their associated soils which have free water at or near the surface; an area whose components are directly or indirectly attributed to the influence of water; of or relating to a river; specifically applied to ecology, “riparian” describes the land immediately adjoining and directly influenced by streams. For example, riparian vegetation includes any and all plant life growing on the land adjoining a stream and directly influenced by the stream.

Riverine. Freshwater wetlands and deepwater habitats within a channel containing periodically or continuously moving water. It includes wetlands with primarily or mostly submerged vegetation but does not include those wetlands with mostly emergent vegetation or shrubs and trees. This habitat encompasses a river or stream, its channel, and the associated aquatic vegetation.

Seabird. A group of birds that obtain at least some food from the ocean by traveling some distance over its surface. They also typically breed on islands and along coastal areas. Seabirds include gulls, alcids, pelicans, albatrosses, storm-petrels, and cormorants, among others.

Songbirds (Also Passerines). A category of birds that are medium to small, perching landbirds. Most are territorial singers and migratory.

Spionids. A type of polychaete.

Step-down Management Plans. Step-down management plans provide the details necessary to implement management strategies identified in the Comprehensive Conservation Plan (Draft Service Manual 602 FW 1.5).

Strategy. A specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives (Draft Service Manual 602 FW 1.5).

Study Area. The area reviewed in detail for wildlife, habitat, and public use potential. For purposes of this CCP/EIS the study area includes the lands within the currently approved Refuge boundary and potential Refuge expansion areas. See page 3-1 for more details.

Sublittoral. Relating to or describing an organism living immediately below low-tide level.

Subsidence. Movement to a lower level or elevation.

Surge Plain. A type of riparian forest flooded during high tides and freshwater storm events from up-river.

Threatened Species (Federal). Species listed under the Endangered Species Act that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

Threatened Species (State). A plant or animal species likely to become endangered in Washington within the near future if factors contributing to population decline or habitat degradation or loss continue.

U.S. Fish and Wildlife Service Mission. The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.

Vegetation Type, Habitat Type, Forest Cover Type. A land classification system based upon the concept of distinct plant associations.

Vision Statement. A concise statement of the desired future condition of the planning unit, based primarily upon the System mission, specific refuge purposes, and other relevant mandates (Draft Service Manual 602 FW 1.5).

Appendix B

Distribution List

APPENDIX B. Distribution List for the Nisqually National Wildlife Refuge Comprehensive Conservation Plan Process

INDIVIDUALS

Abreau, Daisy & Joe
Adams, Bill
Adams, Keith
Ahearn, G.B. & M.
Aitken, Kevin
Alaimo, Julie
Aldrich, Glenn
Allen, Chris
Allen, Donna L
Alvestad, Carey D.
Ambrose, Jerry & Jessie
Anderson, Bruce C.
Anderson, Jon
Anderson, Kenneth A.
Anderson, Laurie
Anderson, Lee D.
Anderson, Susan
Anderson, Todd D.
Angle, Bob & Ilene
Atkins, Rodney
Atkinson, Doug
Attwood, Larry E. & Linda L.
Attwood, Sally J.
Axelson, Elisabeth & Robert R.
Baarslag, Ralph & Carrie
Babare, George M.
Babare, Robert M.
Babare, Robert S.
Bacak, Joyce E. & Walter L.
Bailey, Robert and Sally
Baird, Charles R.
Baker, Doug
Balcom, Mabel I.
Banker, Naida
Baratz - Trustees, Julius & Lois
Barber, Pat
Bartlett, Arthur
Bateson, Don
Batker, Nell & Kenneth E.
Bednar, Ray & Glenda E.
Begley, Jerry
Bell, Brooke
Bellona, Larry
Belting, Dan
Benghart, Richard
Bennet, John & Lizlie
Berg, Lucille
Bernard, Rebecca
Berry, M. K.
Bielefield, Beth
Biggerstqaff, Mike and Ruth
Bjork, Barry
Black, Jeffery S. & Connie M.
Black, Sharon
Blakely, Archie
Blanchard, Dale & Michelle
Blencoe, Lucille M.
Bock, Thais
Boden, David W.
Boesche, Chris
Bolding, Richard
Bontemps, Helen & Jeff
Borgford, Norma J.
Borley, Clarence A. Trust
Bosworth, Donna
Boudman, Rock
Boulet, Angelle
Boyer, Margot
Brady, Patricia M.
Braget Trust
Braget, Ken
Brazel, Chuck
Bressi, Paul M.
Brewer, Larry
Bridges, Theresa Maisell
Brigham, Jim
Brigs, Dorris
Brineman, Scott
Brooks, Norma
Brough, Roger D.
Brown, Arthur E.
Brown, Bob & Peggy
Brown, Garry
Brown, James C.
Brown, Sue
Buckley, Patrick
Bruder, Russ & Teresa
Buckner-Rother, Sherry
Budack, Marietta E.
Buffo, Gary
Buis, Sharon
Bullington, Pam
Burton, Carol
Busler, Cindy
Butler, Ann T.
Cabaniss, Vicki
Cadenhead, Jimmie W.
Cahoon, Jennifer
Campbell, Lois M.
Campbell, Robert J.
Carleton, Kenneth
Carpenter, Lanny & Linda
Carr, Shelley
Carter, David E. & Ursula E.
Casner, Hubert
Chamberlain, Jessie M.
Chambers, Chuck
Char, P.
Chase, Pamela L.
Chojnowski, DANiel & Patricia
Christoffer, Jerold F.
Christy, George & Arlene
Christy, Robert
Chumbly, Edward W.
Churilla, Robert J. & Glenda F.
Cirrito, Carolyn B.
Citrak, Micheal
Clapper, John & Cecil
Cleaver, Marcie
Clement, Kendall S. & Maribeth
Clinton, Jon P.
Cole, Clara M.
Collins, James R. & Jodi K.
Coloff, June M.
Cook, Thomas A.
Cooper, Mary Jane
Cooper, Ruby M.
Coots, Dean E.
Corkum, Ellsworth E.
Cornette, Loretia
Corwin, Alan & Robin
Crabb, Bob
Cragin, Vera
Crihfield, Carol
Crouse, Carl L.
Cummings, M. A.
Curda, Verne
Curtis, Richard
Darroch, Dave
Davidson, Glen E. & Gwen
Davis, Joanne
Davis, Karin K.
Davis, Scott A.
Dawes, Janet
Dazell, Michaele
Dean, Mary Louise
Debes, Jan D.
Deckman, Jill
Derickson, Douglas
Dethoper, Paul & Melinda
Deyoe, Dick
Dibiase, Paul
Dion, Linda
Dixon, Jerry & Carrie
Do, Sang V.
Dock, Jerald & Jacqueline
Doering, Aaron M. & Amy L.
Dolkiewicz, Christina
Donally, Elfriede H.
Doolittle, George
Duncan, Rachel & Beth
Dunkin, Kristie
Dunson, Kayleen

APPENDIX B. Distribution List for the Nisqually National Wildlife Refuge Comprehensive Conservation Plan Process

DuVal, Jerry & Joyce	Gleason, James T. Gleason	Hitchcock, Tim
Earl, Lonita M.	Glecker, Jan	Hobbs, Michael C. & Jana M.
Earles, Robert & Karen	Godina, Lisa M.	Hocutt, Gene
Early, Jim	Goheen, Bryan C. & Sylvia	Hoenig, Elizabeth
Eberling, Marshall E.	Goldstein, Larry	Hoffman, Jim & Allison
Ella Dickson & John Patterson	Goodwin, Robert B.	Hollison, Robert V Jr. & Kathleen M
Ellis, Randy H.	Gordon, Robert H. & Patricia M.	Holmstrom, Carol J.
Ellison, Dennis	Gorgen, Diane	Hook, Judi
Elmgren, Lloyd & Lucille	Gors, Merle & Diane	Horner, Carol
Elwess, Gene & Annie	Gottfriedson, Henry F. & Alison K.	House, Chris
Ely, Vincent C.	Grassi, Nello L.	Huber, P. J.
Emerson, Vicki	Graves, Lynn	Hudon, Mary
Emery, Nancy	Green, Norma	Hukari, Molly
Engle, Stan & Helen	Green, Robert Jr. & Kimberly S.	Hull, Olive
Era, Brandee	Greer, Preston	Hunter, Rhonda
Erickson, Curt	Greetham, Jim	Hvidsten, David A.
Erickson, Mark	Grettenberger, John	Hyatt, Goldie
Evans, William & Kathleen L.	Griffin, Betty	Ida, Jane Taylor
Evenson, Joseph R.	Griffin, Scott & Liesa	Ikari, Larry
Fabing, Keith	Griffith, Tom	Ingersoll, James W.
Faires, April	Gudger, David & Pam	Inman, E. Leon
Farler, Thomas T. & Lovey	Guy, Robert	Inman, J.R.
Farone, Steven M.	Gwill Ging & Joanne Stellini	Inman, Ronald B.
Farrow, John	Gwynn, Sylvia	Jacobsen, Lawrence
Ferguson, Ann	Haiducek, Timothy J. & Joy E.	Janny, Jay & Alice
Fisk, Janet	Haigh, Rick	Jarrett, Sue
Fiske, Winnifred	Halverson, B.	Jauquet, Joseph
Flynn, Margaret E.	Hamilton, Betty	Jennings, Hugh
Foote, Tom	Hamilton, Janeen	Jensen, Richard & Sylvia
Ford, Donald	Hammersmith, Ed	Jensen, Ros
Fortune, Bruce	Hancock, Margaret	Jensen, Roy
Frank, Willie	Handly, Jeff	Jewell, Sharon
Franzen, Woody	Hang, Chanlip Man	Jiby, Barbara
Fraser, Doug	Hardy, Wayne	Johnson, Brenda
Freelund, Ed	Harmon, Bill	Johnson, Lee E.
Freeman, Hazel	Harmon, Carolyn	Johnston, Mark
Friend, Vic D.	Harmon, George	Jones, Allan
Fries, Mary A.	Harold, George F.	Jones, Deke
Froelicher, Julie	Hauf, Herbert & Mary Lou	Jones, Kathleen M.
Frost, Helen	Hayden, David	Jones, Vicki
Fuller, Len	Hayes, Penny	Jonietz, Carla
Gable, Adrian L.	Healy, Tom	Joy, Charles
Galitelo, Gary	Hecht, Edith	Jungbluth, Donna
Galitelo, Peter D Trust	Heilman, Paul	Kaminsky, George
Garrison, Eric	Helligay, Thom	Kara Larsen & Greg Tolbert
Gatzka, Joseph A.	Hellman, Glenn	Kareta, William
Gendron, Kathy	Hempleman, Christine	Kavanaugh, Rob
Getz, D.	Hennessey, Diane	Kavouse, An
Gibbs, Carl W. & Laura L.	Herman, Steve	Kawasaki, Joy
Gibson, Terrill	Herz, Warren	Keith, John & Donna
Giddings, Roxy & William	Hilburn, Maury	Kelley, Mark
Gillmer, Jean	Hill, Dorothy H.	Kelley, Phil
Gilmer, Thelma	Hill, William K.	Kelly, Janet
Ginal, Tom	Hines, James	Kenney, Ed
Glastetter, Howard & Colleen	Hines-Bergstrom, Kenna	Kildahl, Ken

APPENDIX B. Distribution List for the Nisqually National Wildlife Refuge Comprehensive Conservation Plan Process

Killgrove, Gerald & Linda	Lundstrom, Steve	Morello, Roberta
Kimmel, Alan G.	Lux, Mary	Moreno, Connie
Kinch, Karen	Lyle, E.B	Morhous, Mike
Kingley, Susan	Lyon, Micheal & Judy	Morrison, Scott
Kinzner, Delores	M. Piper and C. Costello	Morton, Randy
Kirkland, Dave	Magee, Kathleen R.	Mostue, Brian
Kirkland, Kirk	Manos, Henry & Elaine	Mowrey, Robert
Kivlehan, Jim	Marston, Sally	Mr. Kluh
Knudson, Gary	Martin, Dick & Dawn	Muller, Gretchen
Knudson, James C.	Martin, John & Ann	Murphy, Thomas J.
Knuth, Beverly	Martin, Kathy	Murray, Regina
Knutsen, Mack & Merrily	Martin, Mary	Nastansky, Ray
Knutsen, Robert	Martinsen, Fred	Nastansky, Tony
Koch, Joyce P.	Mathews, Maureen H.	Neff, Sylvia
Kohlenberg, David & Elizabeth	Matteson, Jon Micheal	Nell Fuller & Stephen Green
Kramer, Jan	McBride, Delbert	Nelson, Jim & Carolyn
Krett, Paul	McBride Jr., Albert E.	Nelson, Lin
Krishnamoorti, Signa R.	McBride, Malcolm	Newcomb, Tim
Kuciej, Walter	McCall, Tom	Newling, Charles J.
Kyle, Paul	McCartan, Clarice	Newman, Barbara
Lantor, Judy	McCartan, Richard	Nickel, H. K.
Larry, Kenneth M. & Martha V.	McDonald, Eiko & Mark	Nightingale, Celia
Larson, Betty	McFarland, Martha	Noonan, Michael F.
Larson, Bill	McGillis, John W.	Norbeck, Jim
Larson, Lawrence A. Jr. & Joyce A.	McGovern, Maryanne	Nordstrom, Gail
Lathrop, Elizabeth L.	McIntosh, Brian	Nowlin, Victor S.
Law, Laurie	McMahon, Virginia	Nunze, Cindi
Leaman, Dennis H.	McNett, Dave	Nye Jr., Timothy S.
Lears, Mark	McPhail, John	O'Brien, Mike
Lee, Heidi L.	McQuarrie, Linda	O'Herin, Charles
Lees, Suny	McQueen, Bruce & Patricia	Obert, Bill
Legwold, Rocky L.	McWha, Sandra	Oestreich, Troy D.
Leigh, Joann M.	Mead, Frank	Ogle, Barbara
Leland, Norman C.	Meadows, David	Olmstead, Judy
Lewis, Karen	Melby, Ward	Ortiz, Marjorie P.
Leyser, Selig	Mellish, Wiley & Nina	Ortman, Dave
Lind, Ellis	Metcalf, Alan W.	Ost, Janna
Link, Charles	Meyer, Bryant	Overby, Anne
Lipscomb, Jean C.	Meyer, Herbie	Paradise, Peggy
Lisi, Mark	Meyer, Wallace K.	Patterson, Pauline M.
Lockhard, Frank	Meyers, John	Pauler, Walter & Karen
Lockwood, Cal	Miceli, Tom	Pavey, Art
Loeliger, David & Elenaor	Michelson, Fred	Pearson, J. Norris
Loftin, Fred E. & Claire	Mikkelson, Earl	Pelela, Micheal E.
Loncar, Paul	Miller, David J.	Pelletier, Greg
Lonergan, George A.	Miller, Jackie	Peters, Jo
Long, Harold G. & Dianne L.	Miller, Kathleen	Peterson, Barb
Longley, Jim	Miller, Leslie	Phillips, Douglas S.
Losey, David L. & Sharon	Miller, Rhett	Picha, Thomas
Loucks, Tina	Mills, Liz & Scott	Pickel, Tommie H.
Lovik, Dena L.	Minelga, Antanas	Pigman, Dean A.
Luhr, Pat	Mitchell, Lea	Pittmon, JoAnn & Douglas
Luhr, William R.	Miville, Mary E.	Potter, Irene
Lund, W. R.	Moe, Gregory C.	Potter, Jack
Lundin, Steve	Moore, Greg	Powell, Don & Bobbie

APPENDIX B. Distribution List for the Nisqually National Wildlife Refuge Comprehensive Conservation Plan Process

Pruske, Jim	Schrum, Joseph A. & Devon L.	Tate, John & Juanita D.
Pudists, Marc	Schulz, Carol	Tate, Larry
Puhich, Julie	Schwartz, David P.	Taylor, Gary & Janet
Quinn, Eric	Scott, Sarah	Taylor, Jeanette M.
Rader, Aaron	Scully, Mike	Taylor, Peter
Ragland, Isabel	Seldomridge, Charles B.	Terry, Gwen
Ramsey, Richard	Sheldon, Dyanne	Theoe, Florence
Ramsey, Robert & Georgia	Shelton, C. D. & K. E.	Thiel, Sherry
Rants, Rozanne	Sheridan, Carole	Thom, Ronald M.
Ray, Emily	Sherman, Jack E. & Carrie L.	Thomas, Erick P.
Raymant, Cory	Shiner, Clyde	Thomas, Nancy
Reale, Dom	Shiotani, Tessie	Thompson, Jan E. & Pamela B.
Redfield, Cavour E.	Shlichta, Rena	Thompson, Mary
Reehling, Meghan	Shoal, Robin	Jess J. Thomsen Trust
Reese, Gary Fuller	Simmons, Brian	Thomsen, Paul & Margo
Reese, Katie	Simmons, Ron	Thomsen, Torden
Reintjes, Maurine	Singh, Bajinder	Threatt, Lorena E.
Rice, Donna H.	Skjervold, Tom	Tihonovich, Phil
Rieck, Carroll	Slaby, Sandia	Tobiason, Fred
Riffero, George	Smit, Julie L.	Todd, Tom
Rippe, Rodney	Smith, Curtis W.	Tossey, Mel
Rivers, Richard	Smith, Joann M.	Toth, William J.
Roa, Linda	Smith, Kathy	Townley, Ves
Rocks, Jan	Smith, Kay	Townsend, Caroline
Rodgers, Linda	Smith, Peggy	Trautman, Len
Rodrick, Elizabeth	Smith, Robert	Traver, Bob Traver
Rodrigues, Dennis & Irene	Smith, Stan & Dory	Trivett, Joslyn
Rodriguez, J.F.	Snell, Lloyd E. & Rose M.	Troje, Fran
Rogers, Betsy	Solen, Hermine	Tsiokas, Chris
Rogers, Velma	Sparkman, Ronald E.	Tucker, Gabriel
Roller, Jon & Gail	Sperl, Duane A.	Tuggle, Jim
Roper, Robert	St. Germain, Matt	Tuig, Frances
Rotter, Carl	Stannard, Daphne	Umphaus, Maillian
Runneite, Creighton	Stedman, Gary	Umphres, Ralph
Rzesutek, Richard	Stenklyft, James A.	Unsoeld, Jolene
Salterbach, Lucy	Stevens, Bert & Sandy	Usher, Ann
Salva, Angela	Stevens, Bob	Vadai, Christine
Samuels, Jack & Key	Stevens, Greg	Van Deman, Richard
Sayonc, Betty L.	Stevens, Naki	Van Sweringen, Anne
Sayonc, Helen F.	Stewart, Dave & Eve	Velikanje, Joan M.
Schaap, Tina	Stewart, Will	Verhei, Bruce
Schanzenbach, Rosalie	Stines, Dorothea	Vicencio, Louise
Schaufler, Paul G.	Stoker, Gerrit	Vikan, Victor
Scheuerman, Carl & Alexis	Strasser, Charles A.	Vo, Tri M/Trinh, Dunk K
Schilter, Fred & Patty	Strong, James	Vogel, Sally
Schlorff, Eric	Stuffer, Sonja	Vogt, Bernard
Schmauder, Allen	Sturdivant, Andy	von Tobel, Irene
Schmidt, Harold	Sumner, Ray & Ann	Wackerle, Louise
Schmidt, Kirt	Superfisky, Joe	Wahl, Barry
Schneider, Roland V.	Sutton, Robert E. & Cristan C.	Walker, Lester B.
Schols, Herman & Jean	Suzuki, Nobuya	Walkling, Lee
Schols, Mariann J.	Swan, Nick	Wallin, Beverly
Schooley, Tom	Swenson, Walter	Walter, Karen
Schoyen, Kris	Szymarek, Dick	Ward, Dana
Schrempp, Gwen	Tanaka, Frances	Ward, Hugo F.

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Warnell, Fred
Warner, Angela
Warren, Dorothy G.
Watson, Elizabeth
Watson, Rita
Watts, Kelly L. & Susan A.
Weaver, Vita
Weaver, William
Weber, W.H.
Webster, Jeff
Wechsler, Stewart
Weeks, Bonnie & Dennis
Weidman, Monica
Weihs, Katherine
Weixler, Gigi
Weller, Ryan
Wells, Tony
Weppler, Eric H.
Wertz, Susan
Westberg, Ray
Westerfield, Jack
Westervelt, John & Marilyn
Westlin, Bertha L Estate
Whitesell, Ted
Whitson, Samuel A. & Ardith
Wick, Rolf F.
Wicklund, Rey
Wiedebush, David G.
Wilhelm, Laura
Wilkinson, Charles
Willette, Jon F. & Guila K.
William B. & Jane T., Trustees
Williams, Daphne L.
Williams Family
Williams, Marcella
Williams, S.
Willis, Debbie
Wilson, Jim
Wing, David
Winskill, Edward
Wisti-Peterson, Deborah
Wohlers, Lanette
Wolf, Mark
Wood, Barbara
Wood, Debra & Brandon
Wood, Francis C.
Woodin, Robin
Woodman, John & Carol
Wooster, P. & G.
Wunder, Laurie
Wysocki, Dori
Yankers, Madlain
Yarab, Ken
Yates, Dave & Dolly
Yi, Greg
Yochem, Gene & Karen
Young, Bob
Young, Rickey M. & Gisela
Yung, Marjorie
Zarp, Byron
Zens, Roberta
Zeutenhorst, Phillip L.
Ziemke, Jack A.
Zink, Dave

APPENDIX B. Distribution List for the Nisqually National Wildlife Refuge Comprehensive Conservation Plan Process

<u>Name</u>	<u>Organization</u>
LOCAL LIBRARIES	
Borden, Norma	William G. Reed Library - Shelton
Diaz, Carlos	The Evergreen State College Library
Heriot, Angus	Olympia Public Library
Johnson, Andrew	University of Washington - Suzallo Library
Stroup, Liz	Timberland Libraries
ACADEMIC INSTITUTIONS	
Frenkel, Robert E.	Oregon State University
Friesema, Paul	Northwestern University
Goodwin, Peter	University of Idaho, College of Engineering
Grue, Chris	University of Washington -School of Fisheries
Hacker, Sally D.	Washington State University
Henkels, Mark	Western Oregon University
Humann, Stan	University of Washington - Packwood Exp. Forest
Karr, James R.	University of Washington
Kellogg, Brieanne	Western Washington University
Kessel, C.	Stadium High School
Martinson, A.D.	Pacific Lutheran University
Maun, Chris	Yelm School District
McGregor, Jean	The Evergreen State College
Meyers, John	Lydia Hawk Elementary School
Mr. Pill	Sumner High School
Patterson, Margaret	Tacoma Public Schools
Paulson, Dennis R.	Slater Natural History Museum, University of Puget Sound
Prehmus, Cyndie	University of Washington
Reynolds, Arlene	Garfield Elementary School
Simenstad, Charles	University of Washington
Svendsen, Claus	Skagit Valley College
Wiedeman, Al	The Evergreen State College
ORGANIZATIONS	
All Marine Inc	All Marine, Inc.
Arctic Connections	Arctic Connections
Arrabito, John	Washington Duck Hunters, Inc.
Austin, Will	Austin PNW
Beck, Stephen	Green Pages
Belt Ent Inc	Belt Ent., Inc.
Bennett, Matt	The Coot Company
Borde, Amy B.	Battelle Marine Sciences Laboratory
Breithaupt, Ph.D., Stephen	Foster Wheeler Environmental
Bridges, Teresa M.	Puyallup International
Broadhurst, Ginny	Puget Sound Water Quality Action Team
Burco, Robert A.	Recreational Access
Calambokidis, John	Cascadia Research Collective
Calhoun, Rory	Interagency Committee for Outdoor Recreation
Campbell, Ken	Tahoma Outdoor Pursuits
Canning, Douglas	Nisqually Reach Nature Center
Casbolt, Clark	Outdoor Odysseys
Chaun, Melissa	M.P. Williams Consultants
Conservation Chair	Audubon Society - Black Hills Chapter
Conservation Chair	Audubon Society - Rainier Chapter
Conservation Chair	Audubon Society - Seattle Chapter

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<u>Name</u>	<u>Organization</u>
Conservation Chair	Audubon Society - Tahoma Chapter
Conservation Chair	Grays Harbor Audubon Society
Conservation Chair	Mountaineers - Seattle Branch
Conservation Chair	Mountaineers -Tacoma Branch
Conservation Chair	Mountaineers - Olympia Branch
Conservation Chair	Sierra Club - Cascade Chapter
Corp Of Latter Day Saints	Corp. of Latter Day Saints
Creveling, Jenni	The Watershed Company
Dahl, Barry	Black River Canoe Club
Davison, Robert P.	Wildlife Management Institute
Dean, Tom	People for Puget Sound
Dearborn, Amy	Shannon & Wilson
Dewey, Bill	Taylor Shellfish Farms
Dodge, John	The Olympian
Dunwiddie, Peter	The Nature Conservancy
Dwyer, Tom	Ducks Unlimited
Erler, Eric	Capitol Land Trust
Fields, Robert	National Wildlife Refuge Association
Ford, Gloria	Tuesday Trotters
Garner, John	Tacoma Nature Center - Snake Lake
Greenhagen, Liz	Citizen Environmentalists
Hansen, Ingrid	Sierra Club - Sasquatch Chapter
Hawkins, Chris	South Sound YMCA
Hedrick, Wanda	Nisqually Delta Association
Hirsche, Evan	National Wildlife Refuge Association
Howard, Esther	Cooke Scientific Services
Howdeshell, Tom	South Sound Native Plant Society
Hull, Daniel	Nisqually Reach Nature Center
Industrial Forestry	Industrial Forestry
Jacobs, James A.	All Marine, Inc.
Jess Thomsen, Inc	Jess Thomsen, Inc.
Kauffman, Kris	Water Rights, Inc.
Khangaonkar, Tarang	Foster Wheeler Environmental
Koch, Daniel E.	Gig Harbor Sportsman's Club
Krause, Fayette	The Nature Conservancy of Washington
Kuntz, John	Olympic Outdoor Center
Le Beuf Ltd Partnership	Le Beuf Ltd. Partnership
Levings, Colin	Fisheries & Oceans Canada
Lippy, Karen	Hood Canal Watershed
Liske, Steve	Ducks Unlimited
Local Manager IFA Nursery	IFA Nursery
Manning, Sandra	Society of Wetland Sciences
McAllister Creek Homeowners Assn	McAllister Creek Homeowners Association
Miller, Doug	Nisqually River Basin Land Trust
Miller, Pamela K.	Alaska Community Action on Toxics
Minbashian, Jasmine	Pacific Crest Biodiversity Project
Montgomery, Bob	Montgomery Water Group
Mortensen, Hugh	The Watershed Company
Mottram, Bob	Tacoma News Tribune
Moulton, Peter	Nisqually River Council
Moyer, Lee	Pacific Water Sports
Myers, Dick	Shapiro & Associates
Myers, Doug	Puget Sound Water Quality Action Team

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<u>Name</u>	<u>Organization</u>
Myers, James & Liz	Medicine Creek Farm
Myrick, Bob	PSRC Enhancement Committee
National Audubon Society	Audubon Society - National
Neilsen Pacific Ltd	Neilsen Pacific Ltd.
Nielsen Pacific Ltd	Neilsen Pacific Ltd.
Nisqually Delta Association	Nisqually Delta Association
Nisqually Plaza Rv Park	Nisqually Plaza Rv Park
Nisqually Sportsmen Club	Nisqually Sportsmen Club
Norman, Christi	WetNet
Nourse, Steve & Barbara	Affirm Able Action Association
Nye, Dick	Trout Unlimited
Oliver, Simone	Talasea Consultants
Olsen, Ann	Talasea Consultants
Olympic Peninsula Audubon Society	Audubon Society - Olympic Peninsula Chapter
Owner Or Manager Texaco Food Mart	Texaco Food Mart
Papouchis, Chris	Animal Protection Institute
Paulus, Stuart	ENSR International
Property Tax Department	Puget Sound Energy/Electric
Quarterman, Phil	Wett Pacific, Inc.
Raines, Charlie	Sierra Club - Seattle Chapter
Ranson, Timothy	Puget Sound Water Quality Action Team
Resources NW Consultants	Resources NW Consultants
Rink, Mary	Tahoma Outdoor Pursuits
Shanewise, Steve	The Coot Company
Sider, Kathy	Seattle Aquarium
Skanes, Bob	Pierce County Sportmen's Council
Smith, Andrea	North Star Design
Smith, Colleen	Tetra Tech EM, Inc.
Soper, Curt	The Nature Conservancy of Washington
Stensland, Gary	Harding Lawson & Associates
Stephei, Merle	NW Outdoor Center
Stromstad, Ronald	Ducks Unlimited
Stumpf, Herb	Tahoma Land Conservancy
Summers, Ron	Lonestar Northwest
Torden, Thomsen Inc	Torden, Thomsen Inc.
Tredennick, Cam	Resources Law Group, LLP
Valentine, Brett	Puget Sound Pilots
VanAssche, Terese	TerraSolutions
Warner, Mike	Heritage Resource Center
Wash Div Inv Corp	Wash Div. Inv. Corp
Washington Ornithological Society	Washington Ornithological Society
Way, Bill	The Watershed Company
Wetlands Restoration Specialist	Agua Tierra Environmental Consulting
Weyerhaeuser Real Estate Co	Weyerhaeuser Real Estate Co.
Whitaker, Dan	Northwest Landing
White, Jacques	People for Puget Sound
Williams, Mike	SER NW
Wiltermood, Bob	Wiltermood Assoc., Inc.
Wise Use Movement	Wise Use Movement
Wishart, Bruce	People for Puget Sound

APPENDIX B. Distribution List for the Nisqually National Wildlife Refuge Comprehensive Conservation Plan Process

<u>Name</u>	<u>Organization</u>
CITY AGENCIES & GROUPS	
Biles, Stan	City of Olympia - Mayor
Clarke, Dennis	City of DuPont - Planning Dept.
Crooks, Drew	Lacey Museum
Cunningham, Mary	City of Everett
Cuoio, Greg J.	Lacey City Hall
Cushing, Richard C.	City of Olympia
DeCillo, Victoria	Olympia Public Works Dept
Dennis-Perez, Lisa	City of Lacey Stream Team
Eadie, William	Metro
Executive Director	City of Lacey Chamber of Commerce
Folsom, Pam	Olympia Chamber of Commerce
Haub, Andy	City of Olympia
Krill, Judy	City of DuPont - Mayor
Osgood, Ralph C.	City of Tumwater
Planner	City of Lacey Community Development
Rivas, Adam	City of Yelm
Sackrison, Graeme	Lacey City Council
Sheler, Jim	City of Lacey Parks & Recreation
Svobda, Paul	Tacoma City Light
Talley, Donna	City of Seattle
Waite, Leanna	Metroparks Tacoma
Wulfsberg, Carla	City of Tumwater Museum
Young, Debbie	Tacoma Public Utilities
COUNTY AGENCIES & GROUPS	
Beale, Perry	Thurston County, Noxious Weeds
Bertolotto, Chrys	Pierce County Environmental Services
Bowles, Mason	King County Dept. Developmental and Environmental Services
Council Members	Pierce County
County of Thurston	Thurston County, Building Permit Center
Dickman, Bob	Pierce County Public Works/Utilities
Hartley, Jamie	King County
Kearsley, Janet	Island County Public Utilities District
Ladenburg, John	Pierce County Executive
Meehan-Martin, Paul	Snohomish County Public Works
Morrison, Steve	Thurston Reg. Plan.Council
Nygaard, David	Thurston Conservation District
O'Sullivan, Kevin J.	Thurston County Commissioners
Oberquell, Diane	Thurston County Commissioners
Pierce County Fire District #3	Pierce County Fire District #3
Ritz, Crilly	Snohomish County Public Works
Rose, Katherine	Pierce County Planning
Smith, Deborah	Pierce County Conservation District
Stevenson, Shanna	Thurston County Planning Dept.
Vanderburg, Susie	Thurston County Stream Team
Watkins, Nancy	Tacoma/Pierce County Conv. Vis. Bur.
Welter, Michael	Thurston County Parks & Recreation
White, Gordon	Thurston Community & Environmental Programming
Wolcott, Jan	Pierce County Parks & Recreation Dept.
Wolfe, Cathy	Thurston County Commissioners

APPENDIX B. Distribution List for the Nisqually National Wildlife Refuge Comprehensive Conservation Plan Process

<u>Name</u>	<u>Organization</u>
STATE AGENCIES & GROUPS	
Barela, Martin J.	Government Information Services - Wilson Library
Bates, Ken	Washington Dept. Fish & Wildlife
Berry, Helen	Washington Dept. of Natural Resources -Aquatic Resources
Blocher, Stu	Washington Dept. Fish & Wildlife
Brittill, Dave	Washington Dept. Fish & Wildlife - Wildlife Mgt. Program
Cadwell, Jim	Oregon Dept. Fish & Wildlife
Carman, Randy	Washington Dept. Fish & Wildlife - Habitat Program
Caudill, David	Washington Dept. Fish & Wildlife
Christiansen, Gunnar	Washington Parks & Recreation Commission
Cornu, Craig	Oregon South Slough Reserve
Costello, Rich	Washington Dept. Fish & Wildlife
Craig, Steve	Washington Dept. of Ecology -Southwest Regional Office
Dahmer, Paul	Washington Dept. Fish & Wildlife
Dickes, Betsy	Washington Dept. of Ecology
Duffy, Bob	Washington Dept. of Ecology - Southwest Regional Office
Ehinge, Stephanie	Washington Dept. of Transportation
Ehlers, Paula	Washington Dept. of Ecology
Freymond, Bill	Washington Dept. Fish & Wildlife
Gabel, Betsy	Washington Division of Tourism
Garrett, John	Skagit Wildlife Management Area
Gersib, Dick	Washington Dept. of Ecology
Gibilesco, Chuck	Washington Dept. Fish & Wildlife
Hill, Margaret	Washington Dept. of Ecology
Koss, Bill	Washington State Parks
Kraege, Don	Washington Dept. Fish & Wildlife
Llanso, Roberto	Washington Dept. of Ecology
Lorenzo, Judy	Washington Dept. of Transportation
McAllister, Kelly	Washington Dept. of Fish and Wildlife
Moody, Sandy	Washington Dept. of Natural Resources - NHP
Nisqually River Council	Washington Dept. of Ecology
Patnude, Sue	Washington Dept. Fish & Wildlife - Region 6
Pratt, Cynthia	Washington Dept. Fish & Wildlife
Rubey, Jane	Washington Dept. of Ecology
Savage, Meredith	Washington Dept. of Transportation, Enviromental Affairs
Schirato, Greg	Washington Dept. Fish & Wildlife
Simmons, Don	Washington Parks & Recreation Commission
Skirletz, Jeffrey	Washington State Dept. Fish & Game - Fish Program
Smitch, Curt	Washington Executive Policy Office
Steege, Ted	Washington Dept. of Social Health Services
Tillett, Gene	Washington Dept. Fish & Wildlife
Trefry, Stu	Washington Conservation Commission
WA State Dept of Natural Resources	Washington Dept.of Natural Resources
Wagner, Paul	Washington Dept. of Transportation
Ziegler, Bob	Washington Dept. Fish & Wildlife
Zillges, Gordon	Washington Dept. Fish & Wildlife
Zink, David	Washington Dept. of Ecology
TRIBAL GOVERNMENTS, STAFF &	
Baldwin, Key	Shoalwater Bay Indian Tribe
Dorner, Jeanette	Nisqually Indian Tribe
DuBlanca, Keith	Skokomish Indian Tribe
Kautz, Georgiana	Nisqually Indian Tribe

APPENDIX B. Distribution List for the Nisqually National Wildlife Refuge Comprehensive Conservation Plan Process

<u>Name</u>	<u>Organization</u>
Lear, Cathy	Hoh Indian Tribe
Scott, Stephanie	Nisqually Indian Tribe
Tribal Chair	Nisqually Indian Tribe
Tribal Chair	Puyallup Indian Tribe
Tribal Chair	Squaxin Indian Tribe
Troutt, David	Nisqually Indian Tribe
USA-Trust For Brown, Thomas	Trust For Brown, Thomas
USA-Trust For Martin Sampson	Trust For Martin Sampson
USA-Trust For Nisq Ind Tribe	Trust For Nisq Ind Tribe
USA-Trust For Theresa Bridges	Trust For Theresa Bridges
Walter, George	Nisqually Indian Tribe
Wells, Richard	Nisqually Indian Tribal Office
Wright, Terry	NW Indian Fisheries Commission
FEDERAL AGENCIES & OFFICES	
Ahlstrand, Gary	NPS - Mount Rainier National Park
Baca, Tom	USFWS Region 2 Planning Coordinator
Badgely, Anne	USFWS Regional Director's Office
Berg, Ken	USFWS Western Washington Fish & Wildlife
Bohan, Carolyn	USFWS National Wildlife Refuge System
Brown, Julie S.	Ft.Lewis
Cameron, Forrest	USFWS Refuge Supervisor
Castineira, Wendy	USFWS Division of Realty, Regional Office
Chaney, Marty	USDA Natural Resources Conservation Service
Clark, Dick	US Environmental Protection Agency
Coleman, Rick	USFWS External Affairs Office
Concannon, Julie	USFWS Regional NEPA Coordinator
Cook-Tabor, Carrie	USFWS Fisheries Assistance Branch
Crawford, Phillip	Ft. Lewis
Curry, Nancy	USFWS Turnbull NWR
Davis, Phyllis	Department of Interior, Office of Environmental Policy and Compliance
Drescher, Dave	USFWS Refuge Planning-Cartography/GIS
EIS Filing Section	US Environmental Protection Agency, Office of Federal Activities
Gibbs, Harold	USFWS Region 4 Planning Coordinator
Gloman, Nancy	USFWS Chief, Division of Conservation Planning and Policy
Hagedorn, Gary	USFWS Mid-Columbia River NWR
Harrison, Jean	USFWS Division of Visitor Services, Region Office
Houghten, Chuck	USFWS Refuge Planning
Hughes, Greg	USFWS Hanford Reach National Monument
Kentula, Mary E.	US Environmental Protection Agency
Kilbride, Kevin	USFWS Refuge Biology
Kolar, Margaret	USFWS San Francisco Bay NWRC
Larson, Tom	USFWS Region 3 Planning Coordinator
LaTourette, Joe	Pacific Coast Joint Venture
Lehmann, Gary	US Army Corps of Engineers
Lew, Leslie	USFWS CA/NV Refuge Planning
Lowe, Roy	USFWS Oregon Coastal NWRC
Martin, Robert	US Army Corps of Engineers
Marxen, Mike	USFWS Pacific NW Refuge Planning
Mauermann, Susan	Dept. of Energy - Environmental Planner
McAuliffe, Chris	US Army Corps of Engineers
McCorkle, Loretta	USFWS CA/NV Refuge Planning
Melanson, Tom	USFWS Ridgefield NWRC

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<u>Name</u>	<u>Organization</u>
Moore, Patty	Ft. Lewis
Moore, Stephen	USFWS Refuge Operations Support - Regional Office
Nunn, Mike	USFWS Sheldon-Hart Mountain NWR
Olson, Norm	USFWS Region 5 Planning Coordinator
Osugi, Cathy	USFWS Land Protection Planning
Parks, Virginia	USFWS Cultural Resources Branch
Paveglio, Fred	USFWS Refuge Biology
Peterson, Don	USFWS NEPA Coordinator
Rauch, Paul	USFWS Engineering
Rice, Ken	USFWS Region 7 Planning Coordinator
Rogers, Ralph Thomas	US Environmental Protection Agency
Roy, Anne	USFWS National Conservation Training Center Library
Ryan, Kevin	USFWS Washington Maritime NWRC
Shepard, Randy	USDA - Gifford Pinchot Nat'l Forest
Sheppard, Cathy	USFWS Division of Realty, Regional Office
Sherrod, Brian	USGS - Geo. Science Dept.
Smith, Carey	USFWS - Migratory Birds & Habitat Programs
Spratt, Michael	USFWS Region 6 Planning Coordinator
Stenvall, Charlie	USFWS Willapa NWRC
Storm, Linda	US Environmental Protection Agency
Tanner, Curtis	USFWS Watershed Protect. & Restoration
Van Hoesen, Bill	Ft. Lewis
Walkinshaw, Eric	NPS - Mount Rainier National Park
Webber, Ralph	USFWS Tualatin River NWR
Wesley, Dave	USFWS - Migratory Birds & State Programs
Worthy, Belinda	USFWS - SMAO
Zimmerman, Tara	USFWS - Migratory Birds & Habitat Pograms

WASHINGTON STATE LEGISLATURE

Locke, Gary	Governor of Washington State
Reed, Sam	Secretary of Washington State
Swecker, Dan	Washington State Senator - District 20
Fraser, Karen	Washington State Senator - District 22
Bush, Roger	Washington State Representative - District 2
Alexander, Gary	Washington State Representative - District 20
DeBolt, Richard	Washington State Representative - District 20
Hunt, Sam	Washington State Representative - District 22
Romero, Sandra	Washington State Representative - District 22

U.S. CONGRESS

Cantwell, Maria	United States Senator for Washington State
Murray, Patty	United States Senator for Washington State
Inslee, Jay	United States Representative - District 1
Baird, Brian	United States Representative - District 3
Dicks, Norm	United States Representative - District 6
McDermott, Jim	United States Representative - District 7
Dunn, Jennifer	United States Representative - District 8
Smith, Adam	United States Representative - District 9

Appendix C

References

APPENDIX C: References

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Appendix D

Applicable Laws and Executive Orders

Appendix D: Applicable Laws and Executive Orders.

Law, Regulation, or Guideline	Description
Agency Coordination	
Executive Order No. 12372, Intergovernmental Review of Federal Programs.	Requires that Federal agencies afford other agencies review of documents associated with Federal programs.
Human Rights Regulations	
Executive Order 12898, Environmental Justice. February 11, 1994	Requires Federal agencies to consider the effects of projects and policies on minority and lower income population.
Americans with Disabilities Act of 1990 (ADA)	Provides for access to Federal facilities for the disabled.
Cultural Resources Regulations	
Antiquities Act of 1906	This act authorizes the scientific investigation of antiquities on Federal land. It prohibits and provides penalties for unauthorized search for or collection of artifacts or other objects of scientific interest. The Act also authorizes the president to establish national monuments and cultural areas on Federal lands.
Executive Order No. 11593, Protection and Enhancement of the Cultural Environment	States that if the Service proposes any development activities that may affect archaeological or historical sites, the Service will consult with Federal and State Historic Preservation Officers to comply with Section 106 of the National Historic Preservation Act of 1966, as amended.
Native American Graves Protection and Repatriation Act of 1990 (PL 101-601; 25 USC 3001 et seq.)(NAGPRA)	Regulations for the treatment of Native American graves, human remains, funeral objects, sacred objects, and other objects of cultural patrimony. Requires consultation with Native American Tribes during Federal project planning.
Archaeological Resources Protection Act of 1979 (PL 96-95; 93 STAT 722; 16 USC 470aa-47011), as amended (ARPA)	Protects archaeological resources on public lands.
Executive Order 13007, Indian Sacred Sites. 24 May, 1996	Provides for access to, and ceremonial use of, Indian sacred sites on Federal lands used by Indian religious practitioners and direction to avoid adversely affecting the physical integrity of such sites.
American Indian Religious Freedom Act 1978 (PL 95-341; 92 STAT 469; 42 USC 1996)	Provides for freedom of Native Americans to believe, express, and exercise their traditional religion, including access to important sites.
Archaeological and Historic Preservation Act of 1974 (PL 93-291; 88 STAT 174; 16 USC 469)	Provides for the preservation of historical buildings, sites, and objects of national significance.
National Historic Preservation Act of 1966 (PL 89-665; 50 STAT 915; 16 USC 470 et seq.; 36 CFR 800), as amended (NHPA)	Requires Federal agencies to consider the effects of any actions or programs on historical properties.
Biological Resources Regulations	
Endangered Species Act of 1973 (16 USC 1531 et seq.), as amended (ESA)	Provides for protection of plants, fish, and wildlife that have a designation as threatened or endangered.
National Environmental Policy Act of 1969 (42 USC 4321 et seq) (NEPA)	Requires analysis, public comment, and reporting for environmental impacts of Federal actions.

Appendix D: Applicable Laws and Executive Orders.

Law, Regulation, or Guideline	Description
Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds. Jan. 10, 2001.	Instructs Federal agencies to conserve migratory birds by several means, including the incorporation of strategies and recommendations found in Partners in Flight Bird Conservation Plans, the North American Waterfowl Plan, the North American Waterbird Conservation Plan, and the United States Shorebird Conservation Plan, into agency management plans and guidance documents.
Fish and Wildlife Conservation Act of 1980 (16 USC 661-667e), as amended	Requires the Service to monitor non-gamebird species, identify species of management concern, and implement conservation measures to preclude the need for listing under ESA.
The Bald and Golden Eagle Protection Act of 1940 (16 USC 668 et seq.)	Provides protection for bald and golden eagles.
Migratory Bird Treaty Act of 1918, as amended (MBTA)	Provides protection for bird species that migrate across state and international boundaries.
Marine Mammal Protection Act of 1972 (16 USC 1361 et seq.), as amended (MMPA)	Provides protection to marine mammals
The Clean Water Act of 1972, Section 404 (33 USC 1344 et seq.), as amended	Provides for protection of water quality.
Fish and Wildlife Act of 1956 (16 USC 742a-743j)	Provides Secretary of Interior with authority to protect and manage fish and wildlife resources.
Fish and Wildlife Coordination Act of 1958	Requires equal consideration and coordination of wildlife conservation with other water resource development programs.
National Natural Landmarks Program (PL 74-292; 36 CFR 62)	Sets forth process for establishment of National Natural Landmarks.
Hazardous Materials Regulations	
Oil Pollution Act of 1990 (PL 101-380; 33 USC 2701, et seq.)	Provides oil pollution policies and protections.
Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (PL 96-510; 42 USC 9601, et aeq.) (CERCLA)	Provides mechanism for hazardous waste clean up.
Ports and Waterways Safety Act of 1972 (33 USC 1221 et seq.), as amended	Promotes pollution controls for ships.
Land and Water Use Regulations	
Coastal Zone Management Act of 1972 (16 USC 1451-1464)	Protects environmental quality of coastal areas.
The National Wildlife Refuge System Administration Act of 1966 (16 USC 668dd-668ee)	Administration, management, and planning for National Wildlife Refuges.
National Wildlife Refuge System Improvement Act of 1997 (PL 105-57)	Amends the National Wildlife Refuge System Administration Act of 1966. Requires development of CCPs for all refuges outside of Alaska.
Executive Order 12996, Management and General Public Use of the National Wildlife Refuge System	Recognizes compatible wildlife-dependent recreation uses, such as hunting, fishing, wildlife observation, and photography, and environmental education and interpretation as priority uses of the NWFS.

Appendix D: Applicable Laws and Executive Orders.

Law, Regulation, or Guideline	Description
Executive Order No. 11988, Floodplain Management	Provides for the support, preservation, and enhancement of the natural and beneficial values of floodplains.
Executive Order No. 11990, Protection of Wetlands	Provides for the conservation of the natural and beneficial values of wetlands and their associated habitats.
The Refuge Recreation Act of 1962, as amended	Provides for recreation use that is compatible with the primary purpose of a refuge.
Tribal Coordination	
Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, 6 November 2000	Provides a mechanism for establishing regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications.
Medicine Creek Treaty Act of 1854	Recognizes Nisqually Indian Tribe's fishing, hunting, and gathering rights within their usual and accustomed areas.

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Appendix E

Nisqually NWR Species List

Appendix E: Nisqually NWR Species Lists

E.1 PLANTS

Genus and Species	Family	Common Name	Wetland Status
Trees			
<i>Abies grandis</i>	Pinaceae	grand fir	FACU-
<i>Acer macrophyllum</i>	Aceraceae	big-leaf maple	FACU
* <i>Acer saccharum</i>	Aceraceae	sugar maple	
<i>Alnus rubra</i>	Betulaceae	red alder	FAC
<i>Amelanchier alnifolia</i>	Rosaceae	western serviceberry	FACU
<i>Arbutus menziesii</i>	Ericaceae	pacific madrone	
<i>Cornus nuttallii</i>	Cornaceae	pacific dogwood	
<i>Crataegus douglasii</i>	Rosaceae	Douglas's (black) hawthorn	FAC
* <i>Crataegus laevigata</i> cv.	Rosaceae	Paul's scarlet	
* <i>Crataegus x lavallei</i>	Rosaceae	hawthorn	
* <i>Crataegus monogyna</i>	Rosaceae	common hawthorn	
<i>Fraxinus latifolia</i>	Oleaceae	Oregon ash	FACW
* <i>Ilex aquifolium</i>	Aquifoliaceae	English holly	
<i>Malus fusca</i> [<i>Pyrus</i> f.]	Rosaceae	Oregon crab apple	FAC+
<i>Picea engelmannii</i>	Pinaceae	Engelmann spruce	
<i>Picea sitchensis</i>	Pinaceae	Sitka spruce	FAC
<i>Pinus contorta</i> var. <i>c.</i>	Pinaceae	shore pine	FAC-
* <i>Populus alba</i>	Salicaceae	white poplar	
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> [<i>P. t.</i>]	Salicaceae	black cottonwood	FAC
* <i>Populus nigra</i> var. <i>italica</i>	Salicaceae	Lombardy poplar	
<i>Populus tremuloides</i>	Salicaceae	quaking aspen	FAC+
* <i>Prunus avium</i>	Rosaceae	sweet cherry	
<i>Prunus emarginata</i> var. <i>mollis</i>	Rosaceae	bitter cherry	FACU
<i>Prunus virginiana</i> var. <i>demissa</i>	Rosaceae	choke cherry	FACU
<i>Pseudotsuga menziesii</i> var. <i>m.</i>	Pinaceae	Douglas-fir	
* <i>Pyrus communis</i>	Rosaceae	cultivated pear	
* <i>Pyrus malus</i>	Rosaceae	cultivated apple	
<i>Rhamnus purshiana</i> [<i>Frangula</i> p.]	Rhamnaceae	casacara	FAC-
<i>Salix scouleriana</i>	Salicaceae	Scouler's willow	FAC
* <i>Sorbus aucuparia</i>	Rosaceae	European mountain ash	
<i>Taxus brevifolia</i>	Taxaceae	pacific yew	FACU-
<i>Thuja plicata</i>	Cupressaceae	western redcedar	FAC
<i>Tsuga heterophylla</i>	Pinaceae	western hemlock	FACU-

* Note: * indicates non-native (introduced)

Genus and Species	Family	Common Name	Wetland Status
Shrubs, Brambles & Vines			
<i>Acer circinatum</i>	Aceraceae	vine maple	FACU+
<i>Arctostaphylos uva-ursi</i> var. <i>u.-u.</i>	Ericaceae	kinnikinnick	FACU-
<i>Berberis aquifolium</i> Pursh [<i>Mahonia a.</i>]	Berberidaceae	tall Oregon-grape	
<i>Berberis nervosa</i> Pursh [<i>Mahonia n.</i>]	Berberidaceae	dull Oregon-grape	FACU
<i>Ceanothus sanguineus</i>	Rhamnaceae	redstem ceanothos	NI
<i>Chaenomeles japonica</i>	Rosaceae	flowering quince	
<i>Chimaphila umbellata</i>	Ericaceae	prince's-pine	
<i>Clematis vitalba</i>	Ranunculaceae	travelers-joy	
<i>Cornus sericea</i>	Cornaceae	red-osier dogwood	FACW
ssp. <i>s.</i> [<i>C. stolonifera</i> var. <i>o.</i>]			
<i>Corylus cornuta</i> var. <i>californica</i>	Betulaceae	hazelnut	NI
* <i>Cotoneaster franchetii</i>	Rosaceae	cv. cotoneaster	
* <i>Cytisus scoparius</i> var. <i>s.</i>	Fabaceae	Scot's broom	
* <i>Euonymus fortunei</i>	Celastraceae	euonymus	
<i>Gaultheria shallon</i>	Ericaceae	salal	FACU
* <i>Hedera helix</i>	Araliaceae	English ivy	
<i>Holodiscus discolor</i> var. <i>d.</i>	Rosaceae	ocean-spray	
* <i>Humulus lupulus</i>	Cannabaceae	hops	NI
<i>Linnaea borealis</i> ssp. <i>longiflora</i>	Caprifoliaceae	western twinflower	FACU-
<i>Lonicera ciliosa.</i>	Caprifoliaceae	orange honeysuckle	
<i>Lonicera hispidula</i> var. <i>h.</i>	Caprifoliaceae	hairy honeysuckle	
<i>Lonicera involucrata</i>	Caprifoliaceae	bearberry honeysuckle	FAC
<i>Oemleria cerasiformis</i>	Rosaceae	Indian plum	FACU
<i>Oplopanax horridus</i>	Araliaceae	Devils'-club	FAC
<i>Philadelphus lewisii</i> var. <i>gordonianus</i>	Philadelphaceae	mock orange	
<i>Physocarpus capitatus</i>	Rosaceae	pacific ninebark	FAC+
* <i>Prunus laurocerasus</i>	Rosaceae	cherry laurel	
<i>Ribes divaricatum.</i> var. <i>d</i>	Grossulariaceae	straggly gooseberry	NI
<i>Ribes sanguineum</i> var. <i>s.</i>	Grossulariaceae	red-flowering current	NI
<i>Rosa gymnocarpa</i> var. <i>g.</i>	Rosaceae	baldhip rose	NI
<i>Rosa nutkana</i> var. <i>n.</i>	Rosaceae	Nootka rose	NI
<i>Rosa pisocarpa</i>	Rosaceae	clustered wild rose	FACU
* <i>Rubus discolor</i>	Rosaceae	Himalayan blackberry	NI
* <i>Rubus laciniatus</i>	Rosaceae	evergreen blackberry	FACU+
<i>Rubus leucodermis</i> var. <i>l.</i>	Rosaceae	blackcap	
<i>Rubus parviflorus</i> var. <i>p.</i>	Rosaceae	thimbleberry	FACU+
<i>Rubus spectabilis</i> var. <i>s.</i>	Rosaceae	salmonberry	FAC
<i>Rubus ursinus</i> ssp. <i>macropetalus</i>	Rosaceae	pacific blackberry	FACU
<i>Salix lucida</i> ssp. <i>lasiandra</i> [<i>S. lasiandra</i>]	Salicaceae	pacific willow	FACW+
<i>Salix sitchensis</i>	Salicaceae	Sitka willow	FACW
<i>Sambucus caerulea</i>	Caprifoliaceae	blue elderberry	FAC-
<i>Sambucus racemosa</i>	Caprifoliaceae	coast red elderberry	FACU
ssp. <i>pubens</i> var. <i>arborescens</i>			
* <i>Solanum dulcamara</i>	Solanaceae	bittersweet	FAC
* <i>Spiraea x vanhouttei</i>	Rosaceae	spirea	
<i>Spiraea douglasii</i> ssp. <i>d.</i>	Rosaceae	Douglas' spirea	FACW
<i>Symphoricarpos albus</i> var. <i>laevigatus</i>	Caprifoliaceae	common snowberry	FACU

<u>Genus and Species</u>	<u>Family</u>	<u>Common Name</u>	<u>Wetland Status</u>
Shrubs, Brambles & Vines (continued)			
<i>Symphoricarpos hesperius</i> [<i>S. mollis</i>]	Caprifoliaceae	creeping snowberry	
<i>Toxicodendron diversilobum</i> [<i>Rhus diversiloba</i>]	Anacardiaceae	poison-oak	FACU
* <i>Ulex europaeus</i>	Fabaceae	gorse	
<i>Vaccinium ovatum</i>	Ericaceae	evergreen huckleberry	NI
<i>Vaccinium parvifolium</i>	Ericaceae	red huckleberry	NI
Grasses			
* <i>Agrostis capillaris</i> [<i>A. tenuis</i>]	Poaceae	colonial bentgrass	
<i>Agrostis exarata</i> var. <i>e.</i>	Poaceae	spike bentgrass	FACW
* <i>Agrostis gigantea</i> [<i>A. alba</i> var. <i>a.</i>]	Poaceae	redtop	FAC
<i>Agrostis scabra</i>	Poaceae	hair bentgrass	FAC
* <i>Agrostis stolonifera</i> [<i>A. alba</i> vars. <i>major</i> & <i>palustris</i>]	Poaceae	creeping bentgrass	FAC+
* <i>Aira caryophylla</i>	Poaceae	silver hairgrass	
* <i>Aira praecox</i>	Poaceae	early hairgrass	
* <i>Alopecurus geniculatus</i> var. <i>g.</i>	Poaceae	water foxtail	OBL
* <i>Alopecurus pratensis</i>	Poaceae	meadow foxtail	FACW
* <i>Anthoxanthum odoratum</i>	Poaceae	sweet vernalgrass	FACU
* <i>Arrhenatherum elatius</i>	Poaceae	tall oatgrass	
* <i>Bromus hordeaceus</i> subsp. <i>h.</i> [<i>B. mollis</i>]	Poaceae	soft brome	
<i>Bromus pacificus</i>	Poaceae	pacific brome	
<i>Bromus sitchensis</i> var. <i>s.</i>	Poaceae	Alaska brome	
* <i>Bromus tectorum</i>	Poaceae	cheatgrass	
<i>Bromus vulgaris</i>	Poaceae	Columbia brome	UPL
<i>Cinna latifolia</i>	Poaceae	wood reedgrass	FACW
* <i>Cynosurus echinatus</i>	Poaceae	hedgehog dogtail	
* <i>Dactylis glomerata</i>	Poaceae	orchard grass	FACU
<i>Deschampsia cespitosa</i> ssp. <i>beringensis</i>	Poaceae	tufted hairgrass	FACW
<i>Deschampsia danthonioides</i>	Poaceae	annual hairgrass	FACW-
<i>Distichlis spicata</i> var. <i>s.</i>	Poaceae	seashore saltgrass	FACW
* <i>Echinochloa crusgalli</i>	Poaceae	large barnyard-grass	FACW
<i>Elymus glaucus</i>	Poaceae	blue wildrye	FACU
<i>Elymus mollis</i> ssp. <i>m.</i> [<i>Leymus m.</i>]	Poaceae	dune wildrye	FACU
<i>Elymus trachycaulus</i> ssp. <i>t.</i> [<i>Agropyron trachycaulum</i>]	Poaceae	awned wheatgrass	FAC-
* <i>Elytrigia repens</i> [<i>Agropyron r.</i>]	Poaceae	quackgrass	FACU
* <i>Festuca arundinacea</i>	Poaceae	tall fescue	FACU
<i>Festuca rubra</i>	Poaceae	red fescue	FAC
<i>Glyceria elata</i>	Poaceae	tall mannagrass	FACW+
<i>Glyceria leptostachya</i>	Poaceae	slender-spiked mannagrass	OBL
* <i>Holcus lanatus</i>	Poaceae	common velvet-grass	FAC
* <i>Holcus mollis</i>	Poaceae	creeping velvet-grass	
<i>Hordeum brachyantherum</i>	Poaceae	meadow barley	FACW
<i>Hordeum caespitosum</i> [<i>H. jubatum</i>]	Poaceae	foxtail barley	FAC
* <i>Hordeum murinum</i>	Poaceae	wall barley	
* <i>Hordeum vulgare</i>	Poaceae	common barley	
<i>Leersia oryzoides</i>	Poaceae	rice cutgrass	OBL

Genus and Species	Family	Common Name	Wetland Status
Grasses (continued)			
* <i>Lolium multiflorum</i>	Poaceae	Italian ryegrass	
* <i>Lolium perenne</i>	Poaceae	English ryegrass	FACU
<i>Melica subulata</i> var. <i>s.</i>	Poaceae	Alaska oniongrass	
<i>Panicum capillare</i>	Poaceae	common witchgrass	FAC
* <i>Panicum miliaceum</i>	Poaceae	broom corn millet	
* <i>Phalaris arundinacea</i>	Poaceae	reed canary grass	FACW
* <i>Phleum pratense</i> var. <i>p.</i>	Poaceae	common Timothy	FAC-
* <i>Phragmites australis</i>	Poaceae	Common reed	FACW+
* <i>Poa annua</i>	Poaceae	annual bluegrass	FAC-
<i>Poa compressa</i>	Poaceae	Canada bluegrass	FACU
* <i>Poa pratensis</i> ssp. <i>p.</i>	Poaceae	Kentucky bluegrass	FAC
* <i>Poa trivialis</i>	Poaceae	rough bluegrass	FACW
<i>Puccinellia nuttalliana</i> .	Poaceae	Nuttall's alkali grass	FACW+
* <i>Setaria glauca</i> . [<i>S. lutescens</i>]	Poaceae	yellow bristlegress	
<i>Torreyochloa pallida</i>	Poaceae	weak mannagrass	OBL
var. <i>pauciflora</i> [<i>Puccinella pauciflora</i>]			
<i>Trisetum cernuum</i>	Poaceae	nodding trisetum	
* <i>Vulpia bromoides</i> [<i>Festuca b.</i>]	Poaceae	barren fescue	
* <i>Vulpia myuros</i> var. <i>m.</i> [<i>Festuca m.</i>]	Poaceae	rat-tail vulpia	

Sedges and Rushes

<i>Carex athrostachya</i>	Cyperaceae	slenderbeaked sedge	FACW
<i>Carex canescens</i>	Cyperaceae	grey sedge	FACW+
<i>Carex deweyana</i> var. <i>d.</i>	Cyperaceae	Dewey's sedge	FACU
<i>Carex hendersonii</i>	Cyperaceae	Henderson's sedge	FAC
<i>Carex lyngbyei</i> var. <i>robusta</i>	Cyperaceae	Lyngby's sedge	OBL
<i>Carex obnupta</i>	Cyperaceae	slough sedge	OBL
<i>Carex stipata</i>	Cyperaceae	sawbeak sedge	OBL
<i>Eleocharis obtusa</i> var. <i>ovata</i> [<i>E. ovata</i>]	Cyperaceae	ovate spike-rush	OBL
<i>Eleocharis palustris</i>	Cyperaceae	creeping spike-rush	OBL
<i>Eleocharis parvula</i> var. <i>p.</i>	Cyperaceae	small spike-rush	OBL
<i>Juncus articulatus</i>	Juncaginaceae	jointed rush	OBL
<i>Juncus balticus</i> var. <i>b.</i>	Juncaginaceae	baltic rush	FACW+
<i>Juncus bolanderi</i>	Juncaginaceae	Bolander's rush	OBL
<i>Juncus bufonius</i>	Juncaginaceae	toad rush	FACW
<i>Juncus effusus</i> var. <i>gracilis</i>	Juncaginaceae	soft rush	FACW
<i>Juncus gerardii</i>	Juncaginaceae	mud rush	FACW+
<i>Juncus tenuis</i> var. <i>t.</i>	Juncaginaceae	slender rush	OBL
<i>Luzula multiflora</i> var. <i>m.</i> [<i>L. campestris</i>]	Juncaginaceae	many-flowered wood-rush	FACU
<i>Luzula parviflora</i> var. <i>fastigiata</i>	Juncaginaceae	small-flowered wood-rush	FAC-
<i>Scirpus americanus</i>	Cyperaceae	three-square bulrush	OBL
<i>Scirpus microcarpus</i>	Cyperaceae	small-flowered bulrush	OBL
<i>Scirpus tabernaemontanii</i> [<i>S. validus</i>]	Cyperaceae	soft-stemmed bulrush	OBL

Forbs

<i>Achillea millefolium</i> var. <i>Lanulosa</i>	Asteraceae	common yarrow	FACU
<i>Achlys californica</i> [split from <i>A. triphylla</i>]	Berberidaceae	vanillaleaf	
<i>Actaea rubra</i> ssp. <i>arguta</i> .	Ranunculaceae	western red baneberry	

Genus and Species Forbs (continued)	Family	Common Name	Wetland Status
* <i>Adenocaulon bicolor</i>	Asteraceae	trail-plant	
* <i>Ajuga reptans</i>	Lamiaceae	common bugle	
<i>Alisma plantago-aquatica</i> var. <i>americanum</i>	Alismataceae	American waterplantain	OBL
<i>Allophyllum divaricatum</i>	Polemoniaceae	pink false gilia	
<i>Amaranthus powellii</i>	Amaranthaceae	Powell's amaranth	
<i>Ambrosia</i>	Asteraceae	heath burweed	
<i>Amsinckia menziesii</i>	Boraginaceae	small-flowered fiddleneck	
<i>Anaphalis margaritacea</i>	Asteraceae	pearly everlasting	
<i>Angelica genuflexa</i>	Apiaceae	kneeling angelica	FACW
<i>Angelica lucida</i>	Apiaceae	seacoast angelica	FAC
* <i>Anthemis cotula</i>	Asteraceae	mayweed	FACU
* <i>Anthriscus caucalis</i> var. <i>c.</i> [<i>A. scandicina</i>]	Apiaceae	burr chervil	
* <i>Arabidopsis thaliana</i>	Brassicaceae	thale cress	
* <i>Arctium minus</i>	Asteraceae	common burdock	
<i>Artemisia suksdorfii</i>	Asteraceae	coastal mugwort	
<i>Asarum caudatum</i>	Aristolochiaceae	wild ginger	FACU
<i>Aster subspicatus</i>	Asteraceae	Douglas aster	FAC+
<i>Atriplex patula</i>	Chenopodiaceae	spearscale	FACW
<i>Barbarea orthoceras</i>	Brassicaceae	American wintercress	FACW+
<i>Bidens cernua</i>	Asteraceae	nodding beggar-ticks	FACW+
<i>Bidens frondosa</i>	Asteraceae	leafy beggar-ticks	FACW+
* <i>Brassica rapa</i> [<i>B. campestris</i>]	Brassicaceae	field mustard rape	
<i>Callitriche heterophylla</i>	Callitrichaceae	diverse-leaved water-starwort	OBL
<i>Camassia quamash</i> ssp. <i>breviflora</i>	Liliaceae	common camas	FACW
<i>Campanula scouleri</i>	Campanulaceae	Scouler's harebell	
* <i>Capsella bursa-pastoris</i> var. <i>b.-p.</i>	Brassicaceae	shepherd's purse	FAC-
<i>Cardamine angulata</i>	Brassicaceae	angled bitter-cress	FACW
<i>Cardamine breweri</i> var. <i>orbicularis</i>	Brassicaceae	Brewer's bitter-cress	FACW+
<i>Cardamine nuttallii</i> var. <i>n</i> [<i>C. pulcherrima</i> var. <i>tenella</i>]	Brassicaceae	Nuttall's bitter-cress	
<i>Cardamine oligosperma</i> var. <i>o.</i>	Brassicaceae	little western bitter-cress	FACW
* <i>Centaureum erythraea</i> Raf. [<i>C. umbellatum</i>]	Gentianaceae	European centaury	FAC-
* <i>Cerastium fontanum</i> var. <i>triviale</i> [<i>C. viscosum</i>]	Caryophyllaceae	sticky chickweed	
* <i>Cerastium glomeratum</i> [<i>C. vulgatum</i>]	Caryophyllaceae	mouse-ear chickweed	
<i>Chamomilla suaveolens</i> [<i>Matricaria matricarioides</i>]	Asteraceae	pineapple weed	FACU
* <i>Chenopodium album</i> var. <i>a.</i>	Chenopodiaceae	lamb's quarters	FAC
<i>Chenopodium hybridum</i>	Chenopodiaceae	sowbane	
<i>Circaea alpina</i> ssp. <i>pacifica</i>	Onagraceae	enchanter's nightshade	FACW
* <i>Cirsium arvense</i> var. <i>horridum</i>	Asteraceae	Canada thistle	FACU+
* <i>Cirsium vulgare</i> (Savi) Tenore	Asteraceae	common thistle	FACU
<i>Claytonia perfoliata</i> ssp. <i>p.</i> [<i>Montia p.</i>]	Portulacaceae	miner's-lettuce	FAC
<i>Claytonia sibirica</i> var. <i>s.</i> [<i>Montia s.</i>]	Portulacaceae	Siberian miner's-lettuce	FACW
<i>Collomia grandiflora</i>	Polemoniaceae	large-flowered collomia	
<i>Collomia heterophylla</i>	Polemoniaceae	varied-leaf collomia	
* <i>Conium maculatum</i>	Apiaceae	poison-hemlock	FACW-
* <i>Conyza canadensis</i> [<i>Erigeron c.</i>]	Asteraceae	horseweed	FACU

Genus and Species	Family	Common Name	Wetland Status
Forbs (continued)			
<i>Corallorhiza maculata</i> ssp. <i>m.</i>	Orchidaceae	spotted coral-root	FAC-
<i>Corydalis scouleri</i>	Papaveraceae	Scouler's corydalis	FAC+
* <i>Cotula coronopifolia</i>	Asteraceae	brass-buttons	FACW+
* <i>Crepis capillaris</i>	Asteraceae	smooth hawksbeard	
<i>Cuscuta salina</i> var. <i>major</i>	Cuscutaceae	salt-marsh dodder	FACW
* <i>Daucus carota</i>	Apiaceae	Queen-Anne's-lace	
<i>Dicentra formosa</i> ssp. <i>f.</i>	Papaveraceae	pacific bleeding heart	
* <i>Digitalis purpurea</i> var. <i>p.</i>	Scrophulariaceae	foxglove	
* <i>Dipsacus fullonum</i> [<i>D. sylvestris</i>]	Dipsacaceae	teasel	NI
<i>Disporum hookeri</i> var. <i>oreganum</i>	Liliaceae	Hooker fairy-bell	
<i>Elodea canadensis</i>	Hydrocharitaceae	waterweed	OBL
<i>Epilobium angustifolium</i> ssp. <i>a.</i>	Onagraceae	fireweed	FACU+
<i>Epilobium brachycarpum</i> [<i>E. paniculatum</i>]	Onagraceae	autumn willow-herb	
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i> [<i>E. watsonii</i>]	Onagraceae	hairy willow-herb	FACW-
* <i>Erodium cicutarium</i>	Geraniaceae	stork's-bill geranium	
<i>Erophila verna</i> [<i>Draba v.</i>]	Brassicaceae	vernal whitlow-grass	
<i>Erythronium oregonum</i> ssp. <i>o.</i>	Liliaceae	Oregon fawn lily	
* <i>Eschscholtzia californica</i> ssp. <i>c.</i>	Papaveraceae	California poppy	
<i>Fragaria vesca</i> ssp. <i>bracteata</i>	Rosaceae	woods strawberry	
* <i>Fragaria virginiana</i> ssp. <i>platypetala</i>	Rosaceae	blueleaf strawberry	
* <i>Galanthus nivalis</i>	Liliaceae	snowdrop	
<i>Galium aparine</i>	Rubiaceae	cleavers	FACU
<i>Galium trifidum</i> var. <i>pacificum</i>	Rubiaceae	small bedstraw	FACW+
<i>Galium triflorum</i>	Rubiaceae	sweetscented bedstraw	FACU
* <i>Geranium dissectum</i>	Geraniaceae	cut-leaved geranium	
* <i>Geranium molle</i>	Geraniaceae	dovefoot geranium	
* <i>Geranium robertianum</i>	Geraniaceae	Robert geranium	
<i>Geum macrophyllum</i> var. <i>m.</i>	Rosaceae	Oregon avens	FACW+
<i>Glaux maritima</i> ssp. <i>obtusifolia</i>	Primulaceae	saltwort	FACW+
* <i>Glechoma hederacea</i> var. <i>micrantha</i>	Lamiaceae	ground ivy	FACU+
<i>Gnaphalium canescens</i> ssp. <i>microcephalum</i> [<i>G. m.</i>]	Asteraceae	slender cudweed	
* <i>Gnaphalium uliginosum</i>	Asteraceae	marsh cudweed	FAC+
<i>Goodyera oblongifolia</i>	Orchidaceae	rattlesnake-plantain	FACU-
<i>Grindelia integrifolia</i> var. <i>macrophylla</i>	Asteraceae	Puget Sound gumweed	FACW
<i>Hackelia deflexa</i>	Boraginaceae	nodding stickseed	
<i>Heracleum lanatum</i>	Apiaceae	cow-parsnip	FAC
<i>Hieracium albiflorum</i>	Asteraceae	white-flowered hieracium	
<i>Hippuris vulgaris</i>	Hippurodaceae	common mare's-tail	OBL
<i>Hydrocotyle ranunculoides</i>	Apiaceae	marsh-pennywort	OBL
<i>Hydrophyllum tenuipes</i>	Hydrophyllaceae	pacific waterleaf	FAC
* <i>Hypericum perforatum</i>	Clusiaceae	common St. John's-wort	
* <i>Hypochaeris radicata</i>	Asteraceae	hairy [spotted] cat's-ear	
<i>Impatiens noli-tangere</i>	Balsaminaceae	touch-me-not	FACW
<i>Jaumea carnosa</i>	Asteraceae	fleshy Jaumea	OBL
* <i>Lactuca serriola</i>	Asteraceae	prickly lettuce	FAC-
* <i>Lamium hybridum</i>	Lamiaceae	hybrid dead-nettle	

Genus and Species Forbs (continued)	Family	Common Name	Wetland Status
* <i>Lamium purpureum</i>	Lamiaceae	red dead-nettle	
* <i>Lapsana communis</i>	Asteraceae	nipplewort	
* <i>Lathyrus latifolius</i>	Fabaceae	everlasting pea	
<i>Lathyrus polyphyllus</i>	Fabaceae	leafy peavine	
<i>Lemna minor</i>	Lemnaceae	small duckweed	OBL
<i>Lepidium virginicum</i> var. <i>pubescens</i>	Brassicaceae	Virginia pepperweed	FACU
* <i>Leucanthemum vulgare</i> [<i>Chrysanthemum l.</i>]	Asteraceae	oxeye-daisy	
<i>Lilium columbianum</i>	Liliaceae	columbia lily	FAC
<i>Lilaeopsis occidentalis</i>	Apiaceae	western lilaeopsis	OBL
<i>Listera cordata</i>	Orchidaceae	evergreen orchid	FACU
<i>Lotus micranthus</i> Benth.	Fabaceae	small-flowered deervetch	
* <i>Lotus uliginosus</i>	Fabaceae	big trefoil	
* <i>Ludwigia palustris</i> var. <i>americana</i>	Onagraceae	water purslane	OBL
<i>Lupinus bicolor</i> Lindl.	Fabaceae	two-color lupine	
<i>Lupinus rivularis</i>	Fabaceae	stream lupine	FAC
* <i>Lychnis coronaria</i>	Caryophyllaceae	rose campion	
<i>Lycopus uniflorus</i> Michx.	Lamiaceae	northern bugleweed	OBL
<i>Lysichiton americanum</i>	Araceae	yellow skunk-cabbage	OBL
<i>Madia madioides</i>	Asteraceae	woodland tarweed	
<i>Madia sativa</i> var. <i>s.</i>	Asteraceae	coast tarweed	
<i>Maianthemum dilatatum</i>	Liliaceae	false lily-of-the-valley	FACU-
<i>Maianthemum racemosum</i> ssp. <i>amplexicaule</i>	Liliaceae	western Solomon-plume	FAC-
<i>Maianthemum stellatum</i>	Liliaceae	starry Solomon-plume	FAC
* <i>Malva neglecta</i>	Malvaceae	dwarf mallow	
* <i>Medicago lupulina</i>	Fabaceae	black medic	
* <i>Melilotus alba</i>	Fabaceae	white sweet-clover	FACU
* <i>Melilotus officinalis</i>	Fabaceae	common yellow sweet-clover	FACU
<i>Mentha arvensis</i> var. <i>villosa</i>	Lamiaceae	field mint	FAC
* <i>Mentha piperita</i>	Lamiaceae	peppermint	FACW+
<i>Mertensia paniculata</i> var. <i>Borealis</i>	Boraginaceae	tall mertensia	FAC
<i>Mimulus guttatus</i>	Scrophulariaceae	yellow monkey-flower	OBL
<i>Mimulus moschatus</i> var. <i>sessifolius</i>	Scrophulariaceae	musk-flower	FACW+
<i>Mitella caulescens</i>	Saxifragaceae	leafy mitrewort	
<i>Moehringia macrophylla</i> [<i>Arenaria m.</i>]	Caryophyllaceae	big-leaved sandwort	
<i>Monotropa uniflora</i>	Ericaceae	Indian pipe	FACU
<i>Montia dichotoma</i>	Portulacaceae	dwarf montia	FAC
* <i>Muscari botryoides</i>	Liliaceae	grape hyacinth	
* <i>Mycelis muralis</i> [<i>Lactuca m.</i>]	Asteraceae	wall lettuce	
* <i>Myosotis discolor</i>	Boraginaceae	yellow & blue forget-me-not	FACW
<i>Myosotis laxa</i>	Boraginaceae	small-flowered forget-me-not	OBL
* <i>Myosotis scorpioides</i>	Boraginaceae	common forget-me-not	FACW
<i>Myosotis verna</i>	Boraginaceae	spring forget-me-not	FAC-
<i>Myriophyllum hippuroides</i>	Haloragaceae	western water-milfoil	OBL
* <i>Narcissus pseudonarcissus</i>	Amaryllidaceae	daffodil	
<i>Navarretia squarrosa</i>	Polemoniaceae	skunkweed	
<i>Nemophila parviflora</i> var. <i>p.</i>	Hydrophyllaceae	small-flowered nemophila	
<i>Oenanthe sarmentosa</i>	Apiaceae	pacific water-parsley	OBL
<i>Osmorhiza chilensis</i>	Apiaceae	mountain sweet-cicely	

Genus and Species Forbs (continued)	Family	Common Name	Wetland Status
* <i>Parentucellia viscosa</i>	Scrophulariaceae	yellow parentucellia	FAC-
<i>Petasites frigidus</i> var. <i>palmatus</i> [P. p.]	Asteraceae	sweet coltsfoot	FACU
<i>Phacelia nemoralis</i> ssp. <i>oregonensis</i>	Hydrophyllaceae	woodland phacelia	
<i>Piperia unalascensis</i> [<i>Habenaria</i> u.]	Orchidaceae	Unalaska rein-orchid	FAC
* <i>Plantago lanceolata</i>	Plantaginaceae	English plantain	FACU+
* <i>Plantago major</i> var. <i>m.</i>	Plantaginaceae	common plantain	FAC+
<i>Plantago maritima</i> var. <i>juncoides</i>	Plantaginaceae	maritime plantain	FACW+
* <i>Polygonum aviculare</i> var. <i>a.</i>	Polygonaceae	common knotweed	FACW-
* <i>Polygonum convolvulus</i> var. <i>c.</i>	Polygonaceae	climbing knotweed	FACU-
* <i>Polygonum cuspidatum</i>	Polygonaceae	Japanese knotweed	
<i>Polygonum hydropiperoides</i> var. <i>h.</i>	Polygonaceae	water-pepper	OBL
* <i>Polygonum lapathifolium</i> var. <i>l.</i>	Polygonaceae	dockleaf smartweed	FACW+
* <i>Polygonum persicaria</i>	Polygonaceae	spotted ladysthumb	FACW
* <i>Potamogeton crispus</i>	Potamogetonaceae	curled pondweed	OBL
<i>Potamogeton epihydrus</i>	Potamogetonaceae	ribbon-leaved pondweed	OBL
<i>Potamogeton foliosus</i>	Potamogetonaceae	close-leaved pondweed	OBL
<i>Potamogeton pectinatus</i>	Potamogetonaceae	sago pondweed	OBL
<i>Potentilla anserina</i> ssp. <i>pacifica</i> [P. p.]	Rosaceae	pacific silverweed	OBL
<i>Potentilla gracilis</i> var. <i>g.</i>	Rosaceae	graceful cinquefoil	FAC
<i>Prunella vulgaris</i> var. <i>elongata</i>	Lamiaceae	self-heal	FACU+
<i>Pyrola asarifolia</i>	Ericaceae	common pink wintergreen	FACU
* <i>Ranunculus acris</i>	Ranunculaceae	tall buttercup	FACW-
<i>Ranunculus occidentalis</i> var. <i>o.</i>	Ranunculaceae	western buttercup	FACW
* <i>Ranunculus repens</i> var. <i>r.</i>	Ranunculaceae	creeping buttercup	FACW
<i>Ranunculus sceleratus</i>	Ranunculaceae	celery-leaved buttercup	OBL
<i>Ranunculus uncinatus</i> var. <i>u.</i>	Ranunculaceae	small-flowered buttercup	FAC-
* <i>Raphanus sativas</i>	Brassicaceae	wild radish	
<i>Rorippa curvisiliqua</i> var. <i>a.</i>	Brassicaceae	western yellow cress	FACW+
<i>Rorippa palustris</i> [<i>R. islandica</i>]	Brassicaceae	marsh yellow cress	OBL
* <i>Rumex acetosella</i>	Polygonaceae	sheep sorrel	FACU+
* <i>Rumex crispus</i>	Polygonaceae	curly dock	FACW
<i>Rumex maritimus</i> var. <i>feuginus</i>	Polygonaceae	seaside dock	FACW+
* <i>Rumex obtusifolius</i> ssp. <i>agrestis</i>	Polygonaceae	bitter dock	FAC
<i>Rumex occidentalis</i>	Polygonaceae	western dock	FACW+
<i>Rupertia physodes</i> [<i>Psoralea</i> p.]	Fabaceae	Rupert's scurf-pea	
<i>Ruppia maritima</i>	Potamogetonaceae	ditch-grass	OBL
<i>Sagittaria latifolia</i>	Alismataceae	broadleaf arrowhead	OBL
<i>Salicomia virginica</i>	Chenopodiaceae	American glasswort	OBL
<i>Sanicula crassicaulis</i> var. <i>c.</i>	Apiaceae	pacific sanicle	
<i>Satureja douglasii</i>	Lamiaceae	yerba buena	
* <i>Scleranthus annuus</i>	Caryophyllaceae	annual knawel	
<i>Scutellaria lateriflora</i>	Lamiaceae	blue skullcap	FACW+
* <i>Senecio jacobaea</i>	Asteraceae	tansy ragwort	
* <i>Senecio sylvaticus</i>	Asteraceae	wood groundsel	
* <i>Senecio vulgaris</i>	Asteraceae	common groundsel	FACU
* <i>Silene latifolia</i> ssp. <i>alba</i> [<i>Lychnis</i> a.]	Caryophyllaceae	white campion	
* <i>Sisymbrium altissimum</i>	Brassicaceae	tall tumble-mustard	
* <i>Sisymbrium officinale</i>	Brassicaceae	hedge mustard	

Genus and Species	Family	Common Name	Wetland Status
* <i>Solanum sarrachoides</i>	Solanaceae	hairy nightshade	
<i>Solidago canadensis</i> var. <i>salebrosa</i>	Asteraceae	Canada goldenrod	FACU
* <i>Sonchus arvensis</i>	Asteraceae	perennial sow-thistle	
* <i>Sonchus asper</i>	Asteraceae	prickly sow-thistle	FAC-
<i>Sparganium emersum</i> [<i>S. angustifolium</i>]	Typhaceae	narrow-leaved bur-reed	OBL
* <i>Spergularia arvensis</i>	Caryophyllaceae	spurry	
<i>Spergularia canadensis</i>	Caryophyllaceae	Canada sand-spurry	FACW
<i>Spergularia macrotheca</i>	Caryophyllaceae	beach sand-spurry	FAC
* <i>Spergularia rubra</i>	Caryophyllaceae	red sand-spurry	FAC-
<i>Spiranthes romanzoffiana</i> var. <i>r.</i>	Orchidaceae	hooded ladies'-tresses	OBL
<i>Spirodela polyrrhiza</i>	Lemnaceae	great duckweed	OBL
<i>Stachys cooleyae</i>	Lamiaceae	Cooley's hedge-nettle	FACW
* <i>Stellaria graminea</i>	Caryophyllaceae	lesser starwort	FAC-
<i>Stellaria humifusa</i>	Caryophyllaceae	spreading starwort	OBL
<i>Stellaria longipes</i>	Caryophyllaceae	longstalk starwort	FACW-
* <i>Stellaria media</i>	Caryophyllaceae	common chickweed	
<i>Streptopus amplexifolius</i>	Liliaceae	clasping-leaved twisted-stalk	FAC-
<i>Suaeda maritima</i> [<i>S. calceoliformis</i>]	Chenopodiaceae	herbaceous seablite	FACW+
<i>Synthyris reniformis</i> var. <i>r.</i>	Scrophulariaceae	spring queen	
* <i>Tanacetum vulgare</i>	Asteraceae	common tansy	
* <i>Taraxacum officinale</i>	Asteraceae	common dandelion	FACU
* <i>Teesdalia nudicaulis</i>	Brassicaceae	shepherd's cress	
<i>Tellima grandiflora.</i>	Saxifragaceae	fringecup	
<i>Tiarella trifoliata</i> var. <i>t.</i>	Saxifragaceae	trefoil foamflower	FAC
<i>Tolmiea menziesii</i>	Saxifragaceae	youth-on-age	FAC
* <i>Tragopogon dubius</i>	Asteraceae	yellow salsify	
<i>Trientalis borealis</i> ssp. <i>latifolia</i> [<i>T l.</i>]	Primulaceae	western starflower	FAC
* <i>Trifolium arvense</i>	Fabaceae	hare's-foot	
* <i>Trifolium dubium.</i>	Fabaceae	least hop clover	
* <i>Trifolium hybridum</i>	Fabaceae	alsike clover	FACU+
* <i>Trifolium pratense</i>	Fabaceae	red clover	FACU
* <i>Trifolium repens</i>	Fabaceae	white clover	FACU+
* <i>Trifolium subterraneum</i>	Fabaceae	subterranean clover	
<i>Trifolium wormskjoldii.</i>	Fabaceae	springbank clover	FACW+
<i>Triglochin maritimum</i>	Juncaginaceae	seaside arrow-grass	OBL
<i>Trillium ovatum</i> ssp. <i>o.</i>	Liliaceae	western trillium	NI
<i>Triphysaria pusilla</i> [<i>Orthocarpus pusillus</i>]	Scrophulariaceae	dwarf owl-clover	
<i>Typha latifolia</i>	Typhaceae	common cat-tail	OBL
<i>Urtica dioica</i> ssp. <i>gracilis</i> var. <i>lyallii</i>	Urticaceae	stinging nettle	FAC+
* <i>Verbascum blattaria</i>	Scrophulariaceae	moth mullein	
* <i>Verbascum thapsus</i>	Scrophulariaceae	common mullein	
<i>Veronica beccabunga</i> ssp. <i>americana</i> [<i>V. a.</i>]	Scrophulariaceae	American brooklime	OBL
* <i>Veronica arvensis</i>	Scrophulariaceae	wall speedwell	NI
* <i>Veronica serpyllifolia</i> var. <i>s.</i>	Scrophulariaceae	thyme-leaved speedwell	FAC
<i>Vicia americana</i> ssp. <i>a..</i>	Fabaceae	American vetch	FAC+
* <i>Vicia cracca</i>	Fabaceae	bird vetch	
* <i>Vicia hirsuta</i>	Fabaceae	tiny vetch	
<i>Vicia nigricans</i> ssp. <i>gigantea</i> [<i>V. g.</i>]	Fabaceae	giant vetch	
* <i>Vicia sativa</i>	Fabaceae	common vetch	

Genus and Species	Family	Common Name	Wetland Status
Forbs (continued)			
* <i>Vicia villosa</i>	Fabaceae	hairy vetch	
* <i>Vinca major</i> cv.	Apocynaceae	periwinkle	
<i>Viola sempervirens</i>	Violaceae	evergreen violet	
<i>Wolffia borealis</i> [<i>W. punctata</i>]	Lemnaceae	dotted water-meal	OBL
<i>Zostera marina</i>	Zosteraceae	eel-grass	OBL

Ferns & Allies

<i>Adiantum aleuticum</i> [<i>A. pedatum</i>]	Pteridaceae	maidenhair fern	FAC
<i>Athyrium filix-femina</i> var. <i>cyclosorum</i>	Dryopteridaceae	northern lady fern	FAC
<i>Azolla mexicana</i>	Azollaceae	Mexican mosquito fern	OBL
<i>Blechnum spicant</i>	Blechnaceae	deer fern	FAC+
<i>Dryopteris expansa</i> [<i>D. austriaca</i>]	Dryopteridaceae	spreading wood fern	
<i>Equisetum arvense</i>	Equisetaceae	field horsetail	FAC
<i>Equisetum hyemale</i> var. <i>affine</i>	Equisetaceae	scouring-rush	FACW
<i>Equisetum telmateia</i> var. <i>braunii</i>	Equisetaceae	giant horsetail	FACW
<i>Polypodium glycyrrhiza</i>	Polypodiaceae	licorice fern	
<i>Polystichum munitum</i>	Dryopteridaceae	sword fern	
<i>Pteridium aquilinum</i> var. <i>pubescens</i>	Dennstaedtiaceae	western bracken	FACU

Lichens

Botrydina vulgaris [*B. botryoides*]. Lichenized with *Omphalina ericetorum* (lichen agaric), a Basidiomycete fungus.

<i>Cladonia coniocraea</i>	Cladoniaceae	cup lichen	
<i>Evernia prunastri</i>	Parmeliaceae	antlered-perfume	
<i>Hypogymnia physodes</i>	Parmeliaceae	hooded-bone	
<i>Letharia vulpina</i>	Parmeliaceae	wolf lichen	
<i>Melanelia elegantula</i>	Parmeliaceae	elegant parmelia	
<i>Melanelia exasperatula</i>	Parmeliaceae	roughened parmelia	
<i>Parmelia sulcata</i>	Parmeliaceae	waxpaper-lichen	
<i>Peltigera canina</i>	Peltigeraceae	dog-lichen	
<i>Peltigera polydactylon</i>	Peltigeraceae	frog-pelt	
<i>Physcia</i> sp.	Physciaceae	lichen	
<i>Platismatia glauca</i>	Parmeliaceae	ragged lichen	
<i>Usnea subfloridana</i> [<i>U. comosa</i>]	Parmeliaceae	beard lichen	
<i>Xanthoria candelaria</i>	Teloschistaceae	orange wall lichen	

Mosses & Liverworts

<i>Atrichum</i> sp.	Polytrichaceae	atricum moss	
<i>Aulacomnium androgynum</i>	Aulacomniaceae	lover's-moss	
<i>Bryum capillare</i>	Bryaceae	capillary moss	
<i>Climacium dendroides</i>	Climaciaceae	tree moss	
<i>Conocephalum conicum</i>	Conocephalaceae	snake-liverwort	
<i>Dichodontium pellucidum</i>	Dicranaceae	wet-rock moss	
<i>Dicranoweisia cirrata</i>	Dicranaceae	curly-thatch moss\	
<i>Dicranum tauricum</i>	Dicranaceae	tauricum moss	
<i>Dicranum</i> sp.	Dicranaceae	bryoid fissidens moss	
<i>Drepanocladus uncinatus</i> var. <i>symmetricus</i>	Amblystegiaceae	hook-leaved moss	
<i>Fissidens adianthoides</i>	Fissidentaceae	adiantum moss	

Genus and Species	Family	Common Name	Wetland Status
Mosses & Liverworts (continued)			
<i>Fissidens bryoides</i>	Fissidentaceae	bryoides fissidens moss	
<i>Fontinalis antipyretica</i> var. <i>a.</i>	Fontinalaceae	common water moss	
<i>Funaria hygrometrica</i>	Funariaceae	cord-moss	
<i>Grimmia pulvinata</i>	Grimmiaceae	cushion moss	
<i>Homalothecium fulgescens</i>	Brachytheciaceae	yellow moss	
<i>Hylocomium splendens</i>	Hylocomiaceae	step-moss	
<i>Hypnum circinale</i>	Hypnaceae	coiled-leafmoss	
<i>Hypnum subimponens</i>	Hypnaceae	curly hypnum	
<i>Isothecium stoloniferum</i> [<i>I. spiculiferum</i>]	Brachytheciaceae	cat-tail moss	
<i>Kindbergia oregana</i> [<i>Eurhynchium oreganum</i>]	Brachytheciaceae	Oregon beaked moss	
<i>Leucolepis acanthoneuron</i> [<i>L. menziesii</i>]	Mniaceae	Menzies' tree moss	
<i>Marchantia polymorpha</i>	Marchantiaceae	lung-liverwort	
<i>Neckera douglasii</i>	Neckeraceae	Douglas' neckera	
<i>Orthotrichum consimile</i>	Orthotrichaceae	bristle moss	
<i>Orthotrichum lyellii</i>	Orthotrichaceae	Lyell's bristle moss	
<i>Orthotrichum</i> sp.	Orthotrichaceae	little bristle moss	
<i>Plagiomnium insigne</i> [<i>Mnium i.</i>]	Mniaceae	badge moss	
<i>Plagiomnium venustum</i>	Mniaceae	magnificent moss	
<i>Plagiothecium undulatum</i>	Plagiotheciaceae	wavy-leaved cotton moss	
<i>Polytrichum juniperinum</i>	Polytrichaceae	juniper moss	
<i>Racomitrium canescens</i>	Grimmiaceae	roadside rock moss	
<i>Rhizomnium glabrescens</i> [<i>Mnium g.</i>]	Mniaceae	fan-moss	
<i>Rhytidiadelphus loreus</i>	Hylocomiaceae	lanky-moss	
<i>Rhytidiadelphus triquetrus</i>	Hylocomiaceae	goose-necked moss	
<i>Riccia fluitans</i>	Ricciaceae	floating liverwort	
<i>Scleropodium cespitans</i> var. <i>c.</i>	Brachytheciaceae	flat-moss	
<i>Tortula princeps</i>	Pottiaceae	princely moss	

E.2 WILDLIFE

This list includes wildlife species that have been observed at least once on Nisqually NWR. The birds' common and scientific names and taxonomic order are categorized into family and subfamily groups in accordance with the 7th edition (1998) of the A. O. U. Checklist of North American Birds. * Indicates bird species known to nest on Nisqually delta.

Common Name	Scientific Name	Common Name	Scientific Name
Birds			
Red-throated Loon	<i>Gavia stellata</i>	Short-tailed Shearwater	<i>Puffinus tenuirostris</i>
Pacific Loon	<i>Gavia immer</i>	Leach's Storm-petrel	<i>Oceanodroma leucorhoa</i>
Common Loon	<i>Gavia immer</i>	American White Pelican	<i>Pelecanus erythrorhynchos</i>
Yellow-billed Loon	<i>Gavia adamsii</i>	Brown Pelican	<i>Pelecanus occidentalis</i>
Pied-billed Grebe*	<i>Podilymbus podiceps</i>	Brandt's Cormorant	<i>Phalacrocorax penicillatus</i>
Horned Grebe	<i>Podiceps auritus</i>	Double-crested Cormorant	<i>Phalacrocorax auritus</i>
Red-necked Grebe	<i>Podiceps grisegena</i>	Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>
Eared Grebe	<i>Podiceps nigricollis</i>	American Bittern*	<i>Botaurus lentiginosus</i>
Western Grebe	<i>Aechmophorus occidentalis</i>	Great Blue Heron*	<i>Ardea herodias</i>
Laysan Albatross	<i>Phoebastria immutabilis</i>	Great Egret	<i>Ardea alba</i>
		Green Heron*	<i>Butorides virescens</i>

Common Name	Scientific Name	Common Name	Scientific Name
Birds (continued)			
Turkey Vulture	<i>Cathartes aura</i>	Sandhill Crane	<i>Grus canadensis</i>
Greater White-fronted Goose	<i>Anser albifrons</i>	Barrow's Goldeneye	<i>Bucephala islandica</i>
Snow Goose	<i>Chen caerulescens</i>	Black-bellied Plover	<i>Pluvialis squatarola</i>
Canada Goose*	<i>Branta canadensis</i>	American Golden Plover	<i>Pluvialis dominica</i>
Brant	<i>Branta bernicla</i>	Semipalmated Plover	<i>Charadrius semipalmatus</i>
Trumpeter Swan	<i>Cygnus buccinator</i>	Killdeer*	<i>Charadrius vociferus</i>
Tundra Swan	<i>Cygnus columbianus</i>	Black-necked Stilt	<i>Himantopus mexicanus</i>
Wood Duck*	<i>Aix sponsa</i>	American Avocet	<i>Recurvirostra americana</i>
Gadwall*	<i>Anas strepera</i>	Greater Yellowlegs	<i>Tringa melanoleuca</i>
Eurasian Wigeon	<i>Anas penelope</i>	Lesser Yellowlegs	<i>Tringa flavipes</i>
American Wigeon	<i>Anas americana</i>	Willet	<i>Catoptrophorus semipalmatus</i>
Mallard*	<i>Anas platyrhynchos</i>	Spotted Sandpiper*	<i>Actitis macularia</i>
Blue-winged Teal*	<i>Anas discors</i>	Whimbrel	<i>Numenius phaeopus</i>
Cinnamon Teal*	<i>Anas cyanoptera</i>	Red Knot	<i>Calidris canutus</i>
Northern Shoveler*	<i>Anas clypeata</i>	Sanderling	<i>Calidris alba</i>
Northern Pintail*	<i>Anas acute</i>	Western Sandpiper	<i>Calidris mauri</i>
Green-winged Teal*	<i>Anas crecca</i>	Least Sandpiper	<i>Calidris minutilla</i>
Canvasback	<i>Aythya valisineria</i>	Baird's Sandpiper	<i>Calidris bairdii</i>
Ring-necked Duck*	<i>Aythya collaris</i>	Pectoral Sandpiper	<i>Calidris melanotos</i>
Greater Scaup	<i>Aythya marila</i>	Sharp-tailed Sandpiper	<i>Calidris acuminata</i>
Surf Scoter	<i>Melanitta perspicillata</i>	Dunlin	<i>Calidris alpina</i>
White-winged Scoter	<i>Melanitta fusca</i>	Short-billed Dowitcher	<i>Limnodromus griseus</i>
Black Scoter	<i>Melanitta nigra</i>	Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>
Long-tailed Duck	<i>Clangula hyemalis</i>	Common Snipe*	<i>Gallinago gallinago</i>
Bufflehead	<i>Bucephala albeola</i>	Wilson's Phalarope*	<i>Phalaropus tricolor</i>
Common Goldeneye	<i>Bucephala clangula</i>	Red-necked Phalarope	<i>Phalaropus lobatus</i>
Hooded Merganser*	<i>Lophodytes cucullatus</i>	Parasitic Jaeger	<i>Stercorarius parasiticus</i>
Common Merganser	<i>Mergus merganser</i>	Franklin's Gull	<i>Larus pipixcan</i>
Red-breasted Merganser	<i>Mergus serrator</i>	Black-headed Gull	<i>Larus ridibundus</i>
Ruddy Duck	<i>Oxyura jamaicensis</i>	Bonaparte's Gull	<i>Larus philadelphia</i>
Osprey	<i>Pandion haliaetus</i>	Heermann's Gull	<i>Larus heermanni</i>
White-tailed Kite	<i>Elanus leucurus</i>	Mew Gull	<i>Larus canus</i>
Bald Eagle*	<i>Haliaeetus leucocephalus</i>	Ring-billed Gull	<i>Larus delawarensis</i>
Northern Harrier*	<i>Circus cyaneus</i>	California Gull	<i>Larus californicus</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Herring Gull	<i>Larus argentatus</i>
Cooper's Hawk	<i>Accipiter cooperii</i>	Thayer's Gull	<i>Larus thayeri</i>
Northern Goshawk	<i>Accipiter gentilis</i>	Slaty-backed Gull	<i>Larus schistisagus</i>
Red-shouldered Hawk	<i>Buteo lineatus</i>	Western Gull	<i>Larus occidentalis</i>
Red-tailed Hawk*	<i>Buteo jamaicensis</i>	Glaucous-winged Gull	<i>Larus glaucescens</i>
Rough-legged Hawk	<i>Buteo lagopus</i>	Glaucous-winged/Western Hybrid	<i>Larus sp.</i>
American Kestrel*	<i>Falco sparverius</i>	Glaucous Gull	<i>Larus hyperboreus</i>
Merlin	<i>Falco columbarius</i>	Caspian Tern	<i>Sterna caspia</i>
Gyr Falcon	<i>Falco rusticolus</i>	Common Tern	<i>Sterna hirundo</i>
Peregrine Falcon	<i>Falco peregrinus</i>	Common Murre	<i>Uria aalge</i>
Prairie Falcon	<i>Falco mexicanus</i>	Pigeon Guillemot	<i>Cephus columba</i>
Ring-necked Pheasant*	<i>Phasianus colchicus</i>	Marbled Murrelet	<i>Brachyramphus marmoratus</i>
Ruffed Grouse	<i>Bonasa umbellus</i>	Ancient Murrelet	<i>Synthliboramphus antiquus</i>
Lesser Scaup	<i>Aythya affinis</i>	Rhinoceros Auklet	<i>Cerorhinca monocerata</i>
Mountain Quail	<i>Oreortyx pictus</i>	Rock Dove	<i>Columba livia</i>
California Quail*	<i>Callipepla californica</i>	Band-tailed Pigeon*	<i>Columba fasciata</i>
Northern Bobwhite	<i>Colinus virginianus</i>	Mourning Dove	<i>Zenaida macroura</i>
Virginia Rail*	<i>Rallus limicola</i>	Barn Owl*	<i>Tyto alba</i>
Sora*	<i>Porzana carolina</i>	Great Horned Owl*	<i>Bubo virginianus</i>
American Coot*	<i>Fulica americana</i>	Snowy Owl	<i>Nyctea scandiaca</i>

Common Name	Scientific Name	Common Name	Scientific Name
Birds (continued)		Northern Mockingbird	<i>Mimus polyglottos</i>
Northern Pygmy-Owl	<i>Glaucidium gnoma</i>	European Starling*	<i>Sturnus vulgaris</i>
Long-eared Owl	<i>Asio otus</i>	American Pipit	<i>Anthus rubescens</i>
Short-eared Owl*	<i>Asio flammeus</i>	Cedar Waxwing*	<i>Bombycilla cedrorum</i>
Common Nighthawk	<i>Chordeiles minor</i>	Orange-crowned Warbler*	<i>Vermivora celata</i>
Black Swift	<i>Cypseloides niger</i>	Nashville Warbler	<i>Vermivora ruficapilla</i>
Vaux's Swift	<i>Chaetura vauxi</i>	Yellow Warbler*	<i>Dendroica petechia</i>
Rufous Hummingbird*	<i>Selasphoras rufus</i>	Yellow-rumped Warbler*	<i>Dendroica coronata</i>
Belted Kingfisher	<i>Ceryle alcyon</i>	Black-throated Gray Warbler*	<i>Dendroica nigrescens</i>
Lewis' Woodpecker	<i>Melanerpes lewis</i>	Townsend's Warbler	<i>Dendroica townsendi</i>
Red-breasted Sapsucker*	<i>Sphyrapicus ruber</i>	MacGillivray's Warbler*	<i>Oporornis tolmiei</i>
Downy Woodpecker*	<i>Picoides pubescens</i>	Common Yellowthroat*	<i>Geothlypis trichas</i>
Hairy Woodpecker*	<i>Picoides villosus</i>	Wilson's Warbler*	<i>Wilsonia pusilla</i>
Northern Flicker*	<i>Colaptes auratus</i>	Western Tanager*	<i>Piranga ludoviciana</i>
Pileated Woodpecker*	<i>Dryocopus pileatus</i>	Spotted Towhee*	<i>Pipilo maculatus</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>	American Tree Sparrow	<i>Spizella arborea</i>
Western Wood-pewee*	<i>Contopus sordidulus</i>	Chipping Sparrow	<i>Spizella passerina</i>
Willow Flycatcher*	<i>Empidonax traillii</i>	Vesper Sparrow	<i>Pooecetes gramineus</i>
Pacific-slope Flycatcher*	<i>Empidonax difficilis</i>	Sage Sparrow	<i>Amphispiza belli</i>
Western Kingbird	<i>Tyrannus verticalis</i>	Savannah Sparrow*	<i>Passerculus sandwichensis</i>
Northern Shrike	<i>Lanius excubitor</i>	Fox Sparrow	<i>Passerella iliaca</i>
Cassin's Vireo*	<i>Vireo cassinii</i>	Song Sparrow*	<i>Melospiza melodia</i>
Hutton's Vireo*	<i>Vireo huttoni</i>	Lincoln's Sparrow	<i>Melospiza lincolnii</i>
Warbling Vireo*	<i>Vireo gilvus</i>	White-throated Sparrow	<i>Zonotrichia albicollis</i>
Red-eyed Vireo*	<i>Vireo olivaceus</i>	Harris' Sparrow	<i>Zonotrichia querula</i>
Steller's Jay	<i>Cyanocitta stelleri</i>	White-crowned Sparrow*	<i>Zonotrichia leucophrys</i>
Western Scrub-Jay	<i>Aphelocoma californica</i>	Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>
Black-billed Magpie	<i>Pica hudsonia</i>	Dark-eyed Junco*	<i>Junco hyemalis</i>
American Crow*	<i>Corvus brachyrhynchos</i>	Snow Bunting	<i>Plectrophenax nivalis</i>
Horned Lark	<i>Eremophila alpestris</i>	Black-headed Grosbeak*	<i>Pheucticus melanocephalus</i>
Tree Swallow*	<i>Tachycineta bicolor</i>	Lazuli Bunting	<i>Passerina amoena</i>
Violet-green Swallow*	<i>Tachycineta thalassina</i>	Red-winged Blackbird*	<i>Agelaius phoeniceus</i>
Northern Rough-winged Swallow*	<i>Stelgidopteryx serripennis</i>	Western Meadowlark*	<i>Sturnella neglecta</i>
Bank Swallow	<i>Riparia riparia</i>	Yellow-headed Blackbird*	<i>Xanthocephalus</i>
Cliff Swallow*	<i>Petrochelidon pyrrhonota</i>	<i>xanthocephalus</i>	
Barn Swallow*	<i>Hirundo rustica</i>	Brewer's Blackbird*	<i>Euphagus cyanocephalus</i>
Black-capped Chickadee*	<i>Parus atricapillus</i>	Brown-headed Cowbird*	<i>Molothrus ater</i>
Chestnut-backed Chickadee*	<i>Parus rufescens</i>	Bullock's Oriole*	<i>Icterus bullockii</i>
Bushtit*	<i>Psaltriparus minimus</i>	Purple Finch*	<i>Carpodacus purpureus</i>
Red-breasted Nuthatch*	<i>Sitta canadensis</i>	House Finch*	<i>Carpodacus mexicanus</i>
Brown Creeper*	<i>Certhia americana</i>	Red Crossbill	<i>Loxia curvirostra</i>
Bewick's Wren*	<i>Thryomanes bewickii</i>	Pine Siskin*	<i>Carduelis pinus</i>
House Wren	<i>Troglodytes aedon</i>	American Goldfinch*	<i>Carduelis tristis</i>
Winter Wren*	<i>Troglodytes troglodytes</i>	Evening Grosbeak	<i>Coccothraustes vespertinus</i>
Marsh Wren*	<i>Cistothorus palustris</i>		
Golden-crowned Kinglet*	<i>Regulus satrapa</i>	Mammals	
Ruby-crowned Kinglet	<i>Regulus calendula</i>	Virginia Opossum	<i>Didelphis virginiana</i>
Western Bluebird	<i>Sialia mexicana</i>	Pacific Water Shrew	<i>Sorex bendirii</i>
Townsend's Solitaire	<i>Myadestes townsendi</i>	Trowbridge's Shrew	<i>Sorex trowbridgii</i>
Swainson's Thrush*	<i>Catharus ustulatus</i>	Vagrant Shrew	<i>Sorex vagrans</i>
Hermit Thrush	<i>Catharus guttatus</i>	Shrew-mole	<i>Neurotrichus gibbsii</i>
American Robin*	<i>Turdus migratorius</i>	Coast Mole	<i>Scapanus orarius</i>
Varied Thrush	<i>Ixoreus naevius</i>	Townsend's Mole	<i>Scapanus townsendii</i>
		Masked Shrew	<i>Sorex cinerus</i>

Common Name	Scientific Name	Common Name	Scientific Name
Mammals (continued)		Reptiles	
Long-eared Myotis	<i>Myotis evotis</i>	Northern Alligator Lizard	<i>Elegaria (Gerrhonotus) coeruleus</i>
Little Brown Myotis	<i>Myotis lucifugus</i>	Rubber Boa	<i>Charina bottae</i>
Yuma Myotis	<i>Myotis yumanensis</i>	Western Terrestrial Garter Snake	<i>Thamnophis elegans</i>
Hoary Bat	<i>Lasiurus cinereus</i>	Northwestern Garter Snake	<i>Thamnophis ordinoides</i>
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	Common Garter Snake	<i>Thamnophis sirtalis</i>
Townsend's Big-eared Bat	<i>Plecotus townsendii</i>	Amphibians	
Eastern Cottontail	<i>Sylvilagus floridanus</i>	Northwestern Salamander	<i>Ambystoma gracile</i>
Snowshoe Hare	<i>Lepus americanus</i>	Long-toed Salamander	<i>Ambystoma macrodactylum</i>
Mountain Beaver	<i>Aplodontia rufa</i>	Rough-skinned Newt	<i>Taricha granulosa</i>
Townsend's Chipmunk	<i>Tamias townsendii</i>	Western Red-backed Salamander	<i>Plethodon vehiculum</i>
Eastern Gray Squirrel	<i>Sciurus carolinensis</i>	Pacific Treefrog	<i>Hyla regilla</i>
Douglas' Squirrel	<i>Tamiasciurus douglasii</i>	Red-legged Frog	<i>Rana aurora</i>
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	Bullfrog	<i>Rana catesbeiana</i>
American Beaver	<i>Castor canadensis</i>	Fish	
Deer Mouse	<i>Peromyscus maniculatus</i>	River Lamprey	<i>Lampetra ayresi</i>
Columbian Mouse	<i>Peromyscus oreas</i>	Western Brook Lamprey	<i>Lampetra richardsoni</i>
Bushy-tailed Woodrat	<i>Neotoma cinerea</i>	Pacific Lamprey	<i>Lampetra tridentata</i>
Western Red-backed Vole	<i>Clethrionomys californicus</i>	Spotted Ratfish	<i>Hydrolagus colliei</i>
Long-tailed Vole	<i>Microtus longicaudus</i>	Spiny Dogfish	<i>Squalus acanthias</i>
Creeping Vole	<i>Microtus oregoni</i>	American Shad	<i>Alosa sapidissima</i>
Townsend's Vole	<i>Microtus townsendii</i>	Pacific Herring	<i>Clupea harengus</i>
Common Muskrat	<i>Ondatra zibethicus</i>	Longnose Dace	<i>Rhinichthyus cataractae</i>
Norway Rat	<i>Rattus norvegicus</i>	Largescale Sucker	<i>Catostomus macrocheilus</i>
Black Rat	<i>Rattus rattus</i>	Brown Bullhead	<i>Ameiurus nebulosus</i>
House Mouse	<i>Mus musculus</i>	Surf Smelt	<i>Hypomesus pretiosus</i>
Pacific Jumping Mouse	<i>Zapus trinotatus</i>	Cutthroat Trout	<i>Oncorhynchus clarki</i>
Common Porcupine	<i>Erethizon dorsatum</i>	Pink Salmon	<i>Oncorhynchus gorbuscha</i>
False Killer Whale	<i>Pseudorca crassidens</i>	Chum Salmon	<i>Oncorhynchus keta</i>
Killer Whale	<i>Orcinus orca</i>	Coho Salmon	<i>Oncorhynchus kisutch</i>
Dall's Porpoise	<i>Phocoena dallii</i>	Steelhead (Rainbow Trout)	<i>Oncorhynchus mykiss</i>
Gray Whale	<i>Eschrichtius robustus</i>	Sockeye Salmon	<i>Oncorhynchus nerka</i>
Minke Whale	<i>Balaenoptera acutorostrata</i>	Chinook Salmon	<i>Oncorhynchus tshawytscha</i>
Coyote	<i>Canis latrans</i>	Mountain Whitefish	<i>Prosopium williamsoni</i>
Red Fox	<i>Vulpes vulpes</i>	Bull Trout	<i>Salvelinus confluentus</i>
Northern Sea Lion	<i>Eumetopias jubatus</i>	Dolly Varden	<i>Salvelinus malma</i>
California Sea Lion	<i>Zalophus californianus</i>	Pacific Cod	<i>Gadus macrocephalus</i>
Harbor Seal	<i>Phoca vitulina</i>	Pacific Hake	<i>Merluccius productus</i>
Raccoon	<i>Procyon lotor</i>	Pacific Tomcod	<i>Microgadus proximus</i>
Short-tailed Weasel	<i>Mustela erminea</i>	Walleye Pollock	<i>Theragra chalcogrammus</i>
Long-tailed Weasel	<i>Mustela frenata</i>	Plainfin Midshipman	<i>Porichthys notatus</i>
Mink	<i>Mustela vison</i>	Northern Clingfish	<i>Gobiesox meandricus</i>
Western Spotted Skunk	<i>Spilogale gracilis</i>	Tube-Snout	<i>Aulorhynchus flavidus</i>
Striped Skunk	<i>Mephitis mephitis</i>	Three Spine Stickleback	<i>Gasterosteus aculeatus</i>
Northern River Otter	<i>Lutra canadensis</i>	Bay Pipefish	<i>Syngnathus leptorhynchus</i>
Mountain Lion	<i>Felis concolor</i>		
Bobcat	<i>Lynx rufus</i>		
Mule Deer	<i>Odocoileus hemionus</i>		
aka "Black-tailed Deer			
White-tailed Deer	<i>Odocoileus virginianus</i>		

Common Name	Scientific Name	Common Name	Scientific Name
Fish (continued)		Arrow Goby	<i>Clevelandia ios</i>
Brown Rockfish	<i>Sebastes auriculatus</i>	Bay Goby	<i>Lepidogobius lepidus</i>
Copper Rockfish	<i>Sebastes caurinus</i>	Pacific Sanddab	<i>Citharichthys sordidus</i>
Quillback Rockfish	<i>Sebastes maliger</i>	Speckled Sanddab	<i>Citharichthys stigmaeus</i>
Sablefish	<i>Anoplopoma fimbria</i>	Rex Sole	<i>Errex zachirus</i>
Kelp Greenling	<i>Hexagrammos decagrammus</i>	Flathead Sole	<i>Hippoglossoides elassodon</i>
Rock Greenling	<i>Hexagrammos lagocephalus</i>	Dover Sole	<i>Microstomus pacificus</i>
White-spotted Greenling	<i>Hexagrammos stelleri</i>	Starry Flounder	<i>Platichthys stellatus</i>
Painted Greenling	<i>Oxylebius pictus</i>	Rock Sole	<i>Pleuronectes bilineata</i>
Padded Sculpin	<i>Artedius fenestralis</i>	Butter Sole	<i>Pleuronectes isolepsis</i>
Smoothhead Sculpin	<i>Artedius lateralis</i>	English Sole	<i>Pleuronectes vetulus</i>
Silverspotted Sculpin	<i>Blepsias cirrhosus</i>	C-O Sole	<i>Pleuronichthys coenosus</i>
Roughback Sculpin	<i>Chitonotus pugetensis</i>	Sand Sole	<i>Psetticthys melanostictus</i>
Sharpnose Sculpin	<i>Clinocottus acuticeps</i>	White Sturgeon	<i>Acipenser transmontanus</i>
Calico Sculpin	<i>Clinocottus embryum</i>		
Coastrange Sculpin	<i>Cottus aleuticus</i>	Insects	
Prickly Sculpin	<i>Cottus asper</i>	Common Name	Family Name
Shorthead Sculpin	<i>Cottus confusus</i>	Shield Bugs	Acanthosomatidae
Reticulate/Riffle Sculpin	<i>Cottus perplexus/gulosus</i>	Treehoppers	Aetalionidae
Torrent Sculpin	<i>Cottus rhotheus</i>	Mining Bees	Andrenidae
Buffalo Sculpin	<i>Enophrys bison</i>	Deathwatch Beetles	Anobiidae
Red Irish Lord	<i>Hemilepidotus hemilepidotus</i>	Anthomyiid Flies	Anthomyiidae
Pacific Staghorn Sculpin	<i>Leptocottus armatus</i>	Aphids	Aphididae
Great Sculpin	<i>Myoxocephalus</i>	Bees	Apidae
<i>polyacanthocephalus</i>		Weevils	Apionidae
Sailfin Sculpin	<i>Nautichthys oculofasciatus</i>	Stilt Bugs	Berytidae
Tidepool Sculpin	<i>Oligocottus maculosus</i>	March Flies	Bibionidae
Tadpole Sculpin	<i>Psychrolutes paradoxus</i>	Braconid Wasps	Braconidae
Soft Sculpin	<i>Psychrolutes sigalutes</i>	Moss Beetles	Byrrhidae
Grunt Sculpin	<i>Rhamphocottus richardsoni</i>	Soldier Beetles	Cantharidae
Cabezon	<i>Scorpaenichthys marmoratus</i>	Ground Beetles	Carabidae
Manacled Sculpin	<i>Synchirus gilli</i>	Spittlebugs	Cercopidae
Northern Spearnose Poacher	<i>Agonopsis vulsa</i>	Leaf Beetles	Chrysomelidae
Pygmy Poacher	<i>Odontopyxis trispinosa</i>	Green Lacewings	Chrysopidae
Tube-nose Poacher	<i>Pallasina barbata</i>	Leafhoppers	Cicadellidae
Sturgeon Poacher	<i>Agonus acipenserinus</i>	Tiger Beetles	Cicindelidae
Blacktip Poacher	<i>Xeneretmus latifrons</i>	Ladybug Beetles	Coccinellidae
Ringtail Snailfish	<i>Liparis rutteri</i>	Narrow-winged Damselflies	Coenagrionidae
Pumpkinseed	<i>Lepomis gibbosus</i>	Snout Beetles and Weevils	Curculionidae
Largemouth Bass	<i>Micropterus salmoides</i>	Click Beetles	Elateridae
Black Crappie	<i>Pomoxis nigromaculatus</i>	Balloon Flies	Empididae
Yellow Perch	<i>Perca flavescens</i>	Entomobryid Springtails	Entomobryidae
Shiner Perch	<i>Cymatogaster aggregata</i>	Ants	Formicidae
Striped Seaperch	<i>Embiotoca lateralis</i>	Earwigs	Forficulidae
Pile Perch	<i>Rhacochilus vacca</i>	Metallic Bees	Halictidae
Slender Cockscomb	<i>Anoplarchus insignis</i>	Heleomyzid Flies	Heleomyzidae
High Cockscomb	<i>Anoplarchus purpurescens</i>	Hypogastrurid Springtails	Hypogastruridae
Pacific Snake Prickleback	<i>Lumpenus sagitta</i>	Ichneumons (Parasitic Wasps)	Ichneumonidae
Penpoint Gunnel	<i>Apodichthys flavidus</i>	Isotomid Springtails	Isotomidae
Rockweed Gunnel	<i>Apodichthys fuorum</i>	Scavenger Beetles	Lathridiidae
Crescent Gunnel	<i>Pholis laeta</i>	Seed Bugs	Lygaeidae
Saddleback Gunnel	<i>Pholis ornata</i>	Plant Bugs	Miridae
Pacific Sand Lance	<i>Ammodytes hexapterus</i>	House Flies	Muscidae

Common Name	Family Name	Common Name	Family Name
Insects (continued)		Bark and Ambrosia Beetles	Scolytidae
Fungus Gnats	Mycetophilidae	Carrion Beetles	Silphidae
Pine Flower Snout Beetles	Nemonychidae	Globular Springtails	Sminthuridae
Onychiurid Springtails.	Onychiuridae	Rove Beetles	Staphylinidae
Stink Bugs	Pentatomidae	Hover Flies	Syrphidae
Humpbacked Flies	Phoridae	Tachinid Flies	Tachinidae
Large Caddis Flies	Phryganeidae	Darkling Beetles	Tenebrionidae
Parasitic Wasps	Proctotrupidae	Sawflies	Tenthredinidae
Barklice	Psocoptera*	Pygmy Grasshoppers	Tetrigidae
Psyllids	Psyllidae	Lace Bugs	Tingidae
Scentless Plant Bugs	Rhopalidae	Crane Flies	Tipulidae
Dung Flies	Scatophagidae	Xylophagid Flies	Xylophagidae
Dark-winged Fungus Gnats	Sciaridae		

*Order Name

Appendix F

Plan Implementation

Appendix F: Plan Implementation

INTRODUCTION

Following public review and comment on the Draft EIS, public notification regarding the Service's decision, and CCP approval, Refuge staff will begin to implement the CCP. This chapter describes the various components required to implement the plan over the next 15 years.

The long-term health and protection of Nisqually NWR depends on an informed public and knowledgeable stakeholders. Consistent outreach, good communication, and continued coordination with these Refuge constituents are imperative to successful implementation of the CCP. To maintain and strengthen this important constituency, the CCP provides goals, objectives, and strategies which are not only aimed at protecting, restoring, and conserving wildlife habitat, but also address expanded educational and appropriate, compatible wildlife-dependent recreational opportunities. This appendix identifies the partnership opportunities, projects (Refuge Operating Needs System List), monitoring, staffing, and funding that are necessary to successfully implement the CCP.

PARTNERSHIP OPPORTUNITIES

Because of the Refuge's location within a well-known watershed with numerous partners and in a large metropolitan area, the Refuge is uniquely situated to develop and strengthen unique and creative partnerships in the Puget Sound region. Partnerships will continue to play a crucial role in the protection of the Nisqually delta and the lower watershed and in achieving Refuge goals and objectives. Partnerships will increase our effectiveness, knowledge, and community support, as well as reduce costs. There are numerous opportunities to create or strengthen partnerships with community groups, tribes, organizations, agencies, and others. The Nisqually delta, and therefore the Refuge, provide an important focal point and demonstration area within south Puget Sound to increase environmental awareness and community involvement.

Coordinated efforts will focus on habitat restoration, land protection, environmental education, fish and wildlife monitoring, outreach, and quality wildlife-dependent recreation. The Refuge will continue to strengthen partnerships with the Nisqually River Council, Nisqually Indian Tribe, Washington Department of Fish and Wildlife, land trusts, and other non-profit organizations in the areas of habitat restoration and land protection. The Refuge will strive to exchange information and provide technical assistance to neighboring landowners to further the protection of the lower watershed. A cooperative agreement with the Nisqually Indian Tribe will greatly strengthen coordinated efforts within Refuge boundaries east of the Nisqually River, benefitting habitat restoration and management and public use programs. This effort will strengthen the growing partnership with the Nisqually Indian Tribe. Cooperative agreements with Ducks Unlimited and the Washington Conservation Corps will continue to contribute greatly to habitat restoration and management programs.

An essential partner will continue to be the volunteer services program of the Refuge. This large program is instrumental in achieving much more in all program facets than would be possible with staffing alone. This effort also encourages community involvement and support, as

numerous people can directly contribute to Refuge programs. The Nisqually Refuge Cooperating Association will continue to grow, and this friends' group and key partner to the Refuge will help to further Refuge education, interpretation, and habitat programs.

Collaboration with colleges, universities, local educators, conservation organizations, and environmental education consortiums will enable the Refuge to carry out its plans to improve and enlarge the environmental education, research, and monitoring programs. Cooperative efforts with the Nisqually Reach Nature Center will continue to be strengthened, to improve coordination and increase the amount and quality of environmental education in the delta area.

Conservation organizations and other non-profit groups will contribute significantly to Refuge and delta protection and enhancement. For example, Tahoma Audubon is an Audubon Refuge Keeper providing support to Nisqually NWR. Black Hills Audubon also provides community support on conservation issues and environmental education.

PROJECTS

The table below contains prioritized projects developed as part of the Refuge Operating Needs System (RONS). Brief project descriptions and their associated costs are provided. This list of projects reflects Refuge needs and provides the basis for funding requests from the U.S. Congress, which must be approved by the Service, DOI, and the President's Office of Management and Budget, before being forwarded to Congress.

PROJECTS: REFUGE OPERATING NEEDS (RONS) LIST

	Operating Costs (in thousands)			
	FTEs	One-Time	Recurring Base	Total 1st Year
High Priority Projects				
Expand operation of new public use facilities: Maintenance Worker Maintenance Worker will provide 7-day a week access to the Refuge and full operation of public use and environmental education programs for the 4 million people within 100 miles of the new Visitor Center/Office complex.	1	65	54	119
Expand operation of new public use facilities: operating costs Cover recurring base operating costs of providing 7-day a week access to the Refuge and full operation of public use and environmental education programs for the 4 million people within 100 miles of the new Visitor Center/Office complex.			100	100
Restore tidelands of Nisqually River East parcel: Biologist The Refuge and the Nisqually Indian Tribe will cooperatively restore 270 acres to benefit migratory birds, anadromous fish, and endangered and sensitive species.	1	65	63	128
Restore tidelands of Nisqually River East parcel: dike removal and construction Remove and construct dikes to restore this area to tidal action ^ ment under a cooperative agreement between the Service and the Tribe, including accomplishing all compliance requirements. Ducks Unlimited will also be a partner.		125		125
Improve visitor services and administrative efficiency: Office Assistant A Refuge office assistant will serve as receptionist, answer phone inquiries, and provide improved administrative efficiency for growing Refuge programs including enhanced visitor services, new habitat restoration projects, and new Refuge acquisitions.	1	65	49	114
Improve habitat management, restoration, and protection: Assistant Refuge Manager Assistant Refuge Manager will implement, manage, and monitor restoration of the Black River Unit, accomplishing all compliance requirements, as well as provide law enforcement, resource protection, outreach, and visitor safety services.	1	65	74	139
Develop environmental education program: Environmental Education Specialist An Environmental Education Specialist will develop printed curriculum, design and conduct teacher workshops, and implement an education program to reach up to 15,000 students annually.	1	65	74	139

Operating Costs (in thousands)				
High Priority Projects (continued)	FTEs	One-Time	Recurring Base	Total 1st Year
<p>Monitor habitat restoration and associated wildlife and fish use Biologist will conduct migratory bird, amphibian, and fish surveys and habitat monitoring on 1,000 acres of freshwater and tidal wetland restoration areas to assess and improve habitat restoration and management techniques.</p>	1	76	63	139
<p>Improve volunteer services program Improve and expand volunteer services program with a volunteer coordinator as well as basic supplies, equipment, and uniforms. Volunteers are used to staff the new Visitor Center, support the growing environmental education program, and help accomplish a diversity of projects, including wildlife surveys, exotic vegetation control, and special events.</p>	1	76	63	139
<p>Brown Farm Marsh wetland enhancement In cooperation with Ducks Unlimited, enhance migratory waterfowl and other waterbird habitat in the Brown Farm Marsh by restoring 2 miles of interior ditches and sloughs to enhance water flow, constructing internal dikes to create manageable wetland units, installing water control structures and pump to allow effective flooding and de-watering, and meeting all compliance requirements.</p>		298	50	348
<p>Restore tidelands within Brown Farm Dike In cooperation with Ducks Unlimited, restore and manage 699 acres of estuarine habitat by removing McAllister Creek dike to restore tidal action. This project will support the recovery of Nisqually chinook salmon and other declining salmonids, as well as benefit many other estuarine-associated species and meet compliance requirements.</p>	1	2400	74	2474
<p>Restore 40 acres of surge plain riparian habitat In cooperation with Ducks Unlimited, restore and manage approximately 40 acres of surge plain riparian habitat along the Nisqually River to benefit migratory bird species, primarily neotropical songbirds. Project includes dike removal and berm construction to allow the Nisqually River to flood the site during high flows and allow tidal influence during extreme high tides.</p>		175	10	185
<p>Install tideland boardwalk trail Install boardwalk with interpretive panels and spotting scopes into estuary along old Brown Farm Dike Trail to provide access and viewing of existing tidelands of McAllister Creek and newly restored tidelands within former diked area.</p>		800	10	810
<p>Install visitor contact station at Luhr Beach public boat launch In cooperation with WDFW, install visitor contact station to provide information and interpretation at Luhr Beach public boat launch, which is the main entrance to public waterways on the Refuge.</p>		39	5	44

Operating Costs (in thousands)				
Medium Priority Projects	FTEs	One-Time	Recurring Base	Total 1st Year
<p>Improve water management to restore freshwater wetlands Restore and enhance 200 acres of freshwater wetlands by improving the water management and delivery system.</p>		235	10	245
<p>Restore forested uplands for sensitive species In cooperation with many community partners, reforest 100 acres of clear-cut along McAllister Creek with Douglas-fir and other native trees to improve wildlife habitat and watershed protection.</p>		132	20	152
<p>Install visitor contact station and parking lot on Nisqually River east side In cooperation with the Nisqually Indian Tribe, install visitor contact station to provide Refuge information and interpretation at Nisqually Indian Tribe east side property in association with a new public trail and bank fishing site along the Nisqually River.</p>		120	15	135
<p>Install accessible bank fishing site Construct an accessible bank fishing platform on Nisqually River to provide new opportunities for a broader group of anglers and meet accessibility requirements.</p>		120	10	130
<p>Conduct study to enhance salmonid habitat Conduct study to determine importance and contributions of the Nisqually Estuary to salmonids and the effects of estuarine restoration. The information will be used to help contribute to the recovery of the recently listed chinook salmon and monitor the restoration of the Nisqually delta ecosystem.</p>		141		141
<p>Improve Environmental Education Program Previously used office building would be remodeled to accommodate the environmental education program on an interim basis. Utilities as well as safe, accessible ingress and egress will also need to be set up.</p>		153	10	163
<p>Install wildlife observation deck Install wildlife observation deck with benches and interpretive panels along main trail to provide an additional viewing location. Spotting scopes will also be installed at this site and at other trail locations to enhance wildlife observation opportunities for visitors.</p>		88	7	95

Operating Costs (in thousands)				
	FTEs	One-Time	Recurring Base	Total 1st Year
Low Priority Projects				
Pest plant control using Youth Conservation Corps (YCC) members Utilizing YCC crews for mechanical and hand pulling of pest plants reduces the need for chemical control and the amount of staff time required to accomplish pest plant control goals. YCC crews also assist in maintenance, construction, and trail improvements.		15	47	62
House interns, volunteers, temporary staff, and researchers A Refuge housing unit for use by interns, volunteers, temporary employees, and visiting researchers will greatly increase the ability to accomplish important management studies, surveys, and provide improved education and visitor services.		120	10	30
Increase outreach and education with traveling exhibits Design and fabricate two traveling exhibits on refuges in the complex for special events, fairs, public meetings, and loaning to schools and cooperators in the area.		28	5	33
Develop video to increase outreach and education Complete, on contract, Refuge video focusing on wildlife and habitat resources of Nisqually NWR, to enhance outreach efforts and strengthen education program.		54		54

MONITORING

Monitoring is the process of collecting information to evaluate if objectives and anticipated or assumed results of a management program are being realized, or if implementation is proceeding as planned (USDA, USDI 1994).

Adaptive Management is a flexible approach to long-term management that is directed by the results of ongoing monitoring activities. Management techniques, objectives, and strategies (Appendix I) are regularly evaluated over time and the new data are used to adapt both management objectives and techniques to better achieve the Refuge's goals.

Monitoring has been an ongoing activity on Nisqually NWR. Past monitoring efforts on the Refuge have generally focused on key species and habitats, typically those considered sensitive (e.g., threatened or sensitive species), or those identified in the Refuge purpose (e.g., migratory waterfowl). While these are adequate to identify trends in relative abundance or habitat use for higher priority species, they usually fail to examine the entire Refuge landscape. Ideally, a Refuge monitoring program would occur across several levels of biological organization including genetic, population/species, community/ecosystem, and regional landscapes. However, limited funding usually results in monitoring programs focused on selected components that are representative of many other species/habitats (considered indicator species). In recent years, most of the monitoring efforts on the Refuge have been concentrated on documenting the location and extent of waterfowl use of the estuarine and freshwater habitats.

Monitoring has been identified as a strategy for six of the CCP objectives and will be an ongoing and important program on Nisqually NWR for the life of the CCP. The CCP monitoring program will focus on measuring the success of CCP implementation, particularly the effectiveness of the various habitat restoration projects. The program is designed to provide some flexibility in CCP implementation by allowing the Refuge to change or adapt management practices or monitoring methods as the result of monitoring data.

The various monitoring programs that will be implemented on the Refuge under the CCP are briefly described in the table titled CCP Monitoring Programs and Projects. This conceptual framework will serve as a starting point for preparation of a step-down monitoring plan, which will provide detailed methods, timing, and costs. Staffing needs have been identified in the strategies for each of the objective that includes monitoring.

CCP Monitoring Programs and Projects

Program/Project	Purpose	Associated Objective	Indicator	Links to Regional Monitoring Efforts
<p>Program: Habitat Monitoring Associated Goal: Conserve, manage, restore, and enhance native habitats and associated plant and wildlife species representative of the Puget Sound lowlands, with a special emphasis on migratory birds and salmon.</p>				
<p>Project 1: Estuarine Habitat Mapping</p>	<p>Determine the amount and development of restored estuarine habitat over time</p>	<p>1.1 - Restore 699 acres of estuarine habitat in the Nisqually River delta estuary and near shore environments... including tidal influences, sediment delivery, native plant communities, and distributary channel networks.</p>	<p>Development of restored estuarine habitat ranging from mudflats to high salt marsh</p>	<p>None</p>
<p>Project 2: Vegetation Sampling</p>	<p>Document vegetation response in restored habitats</p>	<p>1.3 - Protect, restore, and enhance a mosaic of 600 acres of freshwater wetlands and grasslands in the Nisqually River delta and lower Nisqually River watershed to serve as foraging and nesting habitat for a variety of migratory and resident bird species, mammals, and native amphibians. 1.4 - Protect, restore, maintain, and enhance the ecological functions of approximately 1,000 acres of riparian habitat in the Nisqually River delta and corridor to provide foraging and breeding habitat for migratory and resident land birds and fish. 1.5 - Protect 400-600 acres of native forested bluff habitat along McAllister Creek and the eastern boundary of the Refuge by protecting and restoring existing Refuge lands, and acquiring significant bluff parcels immediately east of the current Refuge boundary and south in the Nisqually Valley.</p>	<p>Vegetation cover and plant species composition</p>	<p>None</p>

Program/Project	Purpose	Associated Objective	Indicator	Links to Regional Monitoring Efforts
Project 3: Water Quality	Monitor water quality in estuarine restoration area	1.1 - Restore 699 acres of estuarine habitat in the Nisqually River delta estuary and near shore environments.... including tidal influences, sediment delivery, native plant communities, and distributary channel networks.	Dissolved oxygen, salinity, water temperature, sediment deposition	None
Project 4: Invasive Species Monitoring	Track the locations and abundance of invasive species on the Refuge, monitor new introductions, and incorporate data into an Integrated Pest Management Plan	<p>1.1 - Restore estuarine habitat in the Nisqually River delta estuary and near shore environments.... including tidal influences, sediment delivery, native plant communities, and distributary channel networks.</p> <p>1.3 - Protect, restore, and enhance a mosaic of 600 acres of freshwater wetlands and grasslands in the Nisqually River delta and lower Nisqually River watershed to serve as foraging and nesting habitat for a variety of migratory and resident bird species, mammals, and native amphibians.</p> <p>1.4 - Protect, restore, maintain, and enhance the ecological functions of approximately 1,000 acres of riparian habitat in the Nisqually River delta and corridor to provide foraging and breeding habitat for migratory and resident land birds and fish.</p> <p>1.5 - Protect 400-600 acres of native forested bluff habitat along McAllister Creek and the eastern boundary of the Refuge by protecting and restoring existing Refuge lands, and acquiring significant bluff parcels immediately east of the current Refuge boundary and south in the Nisqually Valley.</p>	Invasive species (weeds and exotic wildlife) presence and distribution	None
<p>Program: Wildlife Monitoring Associated Goal: Conserve, manage, restore, and enhance native habitats and associated plant and wildlife species representative of the Puget Sound lowlands, with a special emphasis on migratory birds and salmon.</p>				

Program/Project	Purpose	Associated Objective	Indicator	Links to Regional Monitoring Efforts
Project 1: Waterfowl Surveys	Document waterfowl use of restored estuarine and freshwater habitats	1.1 - Restore 699 acres of estuarine habitat in the Nisqually River delta estuary and near shore environments.... including tidal influences, sediment delivery, native plant communities, and distributary channel networks. 1.3 - Protect, restore, and enhance a mosaic of 600 acres of freshwater wetlands and grasslands in the Nisqually River delta and lower Nisqually River watershed to serve as foraging and nesting habitat for a variety of migratory and resident bird species, mammals, and native amphibians.	Waterfowl seasonal abundance, distribution, and species composition	The Service's National Pacific Flyway databases for the Midwinter Waterfowl Survey
Project 2: Shorebird Surveys	Document shorebird use in estuarine restoration area	1.1 - Restore 699 acres of estuarine habitat in the Nisqually River delta estuary and near shore environments.... including tidal influences, sediment delivery, native plant communities, and distributary channel networks.	Shorebird seasonal abundance, distribution, and species composition	PRISM-Program for Regional and International Shorebird Monitoring-a pilot monitoring program endorsed by the Service and the U.S. Shorebird Council
Project 3: Amphibian Sampling	Document native amphibian species use of restored freshwater wetlands	1.3 - Protect, restore, and enhance a mosaic of 600 acres of freshwater wetlands and grasslands in the Nisqually River delta and lower Nisqually River watershed to serve as foraging and nesting habitat for a variety of migratory and resident bird species, mammals, and native amphibians.	Red-legged frog abundance and distribution	None
Project 4: Raptor Surveys	Document raptor use of restored freshwater wetlands and grasslands	1.3 - Protect, restore, and enhance a mosaic of 600 acres of freshwater wetlands and grasslands in the Nisqually River delta and lower Nisqually River watershed to serve as foraging and nesting habitat for a variety of migratory and resident bird species, mammals, and native amphibians.	Raptor abundance and distribution	None

Program/Project	Purpose	Associated Objective	Indicator	Links to Regional Monitoring Efforts
Project 5: Landbird Monitoring	Document migratory and resident landbird use of restored riparian habitat	1.4 - Protect, restore, maintain, and enhance the ecological functions of approximately 1,500 acres of riparian habitat in the Nisqually River delta and corridor to provide foraging and breeding habitat for migratory and resident land birds	Landbird relative abundance and distribution	Monitoring Avian Populations Database and Washington GAP Analysis Program
<p>Program: Threatened, Endangered, and Special Status Species Monitoring Associated Goal: Support recovery and protection efforts for Federal and State threatened and endangered species, species of concern, and their habitats of the Nisqually River delta and watershed.</p>				
Project 1: - Fish Monitoring	Document fish response in restored estuarine habitat and support threatened and endangered species recovery efforts	<p>1.1 - Restore 699 acres of estuarine habitat in the Nisqually River delta estuary and near shore environments.... including tidal influences, sediment delivery, native plant communities, and distributary channel networks.</p> <p>2.1 - Protect and restore approximately 4,400 acres of estuarine, freshwater, stream, and riparian habitats to protect declining runs of the chinook salmon and bull trout, which are Federally listed as threatened.</p>	Salmonid abundance and distribution	None
Project 2: Bald Eagle Monitoring	Monitor bald eagle nesting activity and population trends on the Refuge	<p>1.5 - Protect 400-600 acres of native forested bluff habitat along McAllister Creek and the eastern boundary of the Refuge by protecting and restoring existing Refuge lands, and acquiring significant bluff parcels immediately east of the current Refuge boundary and south in the Nisqually Valley.</p> <p>2.3 - Identify, monitor, and protect all special-status plant and animal species on the Refuge, focusing on species that are State or Federally listed, proposed for listing, or candidates for listing.</p>	Nesting activity, productivity, abundance, and distribution	WDFW bald eagle nest tracking program; Federal recovery data

Program/Project	Purpose	Associated Objective	Indicator	Links to Regional Monitoring Efforts
Project 3: Great Blue Heron Monitoring	Monitor great blue heron nesting activity and population trends on the Refuge	1.5 - Protect 400-600 acres of native forested bluff habitat along McAllister Creek and the eastern boundary of the Refuge by protecting and restoring existing Refuge lands, and acquiring significant bluff parcels immediately east of the current Refuge boundary and south in the Nisqually Valley. 2.3 - Identify, monitor, and protect all special-status plant and animal species on the Refuge, focusing on species that are State or Federally listed, proposed for listing, or candidates for listing.	Nesting activity, productivity, abundance, and distribution	WDFW studies on great blue herons
Program: Environmental Education Associated Goal: Provide quality environmental education opportunities focusing on the fish, wildlife, and habitats of the Nisqually River delta and watershed.				
Project 1: Environmental Education Program Monitoring	Monitor effectiveness of environmental education program	3.1 - Provide a quality environmental education program at Nisqually with specific learning objectives and diverse opportunities that 1) meet State standards for learning; 2) are based on Refuge and Nisqually watershed conservation and management programs; 3) support the mission of the Service; and 4) provide stewardship opportunities.	Teacher and student evaluations	None
Programs: Wildlife-dependent Recreation Associated Goal: Provide quality wildlife-dependent recreation, interpretation, and outreach opportunities to enhance public appreciation, understanding, and enjoyment of fish, wildlife, habitats, and cultural resources of the Nisqually River delta and watershed.				
Project 1: Hunt Program Monitoring	Monitor quality of hunt program	4.1 - Open 191 acres to waterfowl hunting 7 days per week within 1-2 years after CCP approval. Refuge lands would combine with WDFW lands to create more manageable and enforceable hunt boundaries that would reduce conflicts with other users, reduce confusion for hunters, provide sufficient sanctuary, create uncrowded conditions, and ensure a reasonable harvest. The Refuge would also explore new opportunities for “walk-in” waterfowl hunting as property is acquired south of I-5.	Visitor evaluations; hunter bag check; compliance with regulations	None

Program/Project	Purpose	Associated Objective	Indicator	Links to Regional Monitoring Efforts
Project 2: Fishing Program Monitoring	Monitor quality of fishing program	4.2 - Provide a variety of quality boat and bank fishing experiences in selected areas which are safe, consistent with State regulations, and compatible with Refuge resources and purposes.	Visitor evaluations; compliance with regulations	None
Project 3: Wildlife Photography Program Monitoring	Monitor quality of wildlife photography program	4.5 - Provide a variety of quality wildlife photography opportunities to increase visitor understanding and appreciation for and enjoyment of Nisqually River delta resources.	Visitor evaluations	None

STAFFING AND FUNDING

Current Staffing

Base budget FY2000 = \$565,840

Fee Funds for FY 2000 = \$39,782

AmeriCorps members = 6 FTEs and 72 Refuge Volunteers contributed 3.8 FTE s for FY2000.

Current Staffing		
Staff Type	Employment Status	Salary Rating
Management		
Project Leader	PFT	GS 13
Deputy Project Leader	PFT	GS 12
Administrative		
Administrative Assistant	PFT	GS 7
Receptionist/Clerk/Typist	TFT	GS 4
Biology		
Wildlife Biologist	PFT	GS 11
Fish and Wildlife Biologist	TFT	GS 7
Public Use		
Outdoor Recreation Planner	PFT	GS 11
Park Ranger	PFT	GS 7
Maintenance		
Maintenance worker	PFT	WG 8
Maintenance worker	PFT	WG 8

Future (Proposed) Staffing

Future (Proposed) Staffing		
Staff Type	Employment Status	Salary Rating
Management		
*Project Leader	PFT	GS 13
*Deputy Project Leader	PFT	GS 12
Refuge Manager	PFT	GS 11

Staff Type	Employment Status	Salary Rating
Refuge Manager	PFT	GS 11
Refuge Manager	PFT	GS 11
Refuge Operations Specialist	PFT	GS 9/11
Administrative		
*Administrative Assistant	PFT	GS 7
*Receptionist/Clerk/Typist	PFT	GS 4/5
Receptionist/Clerk/Typist	PFT	GS 4/5
Purchasing Agent	PFT	GS 6
Biology		
*Wildlife Biologist	PFT	GS 11
Wildlife Biologist	PFT	GS 9/11
Wildlife Biologist	PFT	GS 7/9/11
Fish and Wildlife Biologist	PFT	GS 7/9
Fish and Wildlife Biologist	PFT	GS 7/9
*Fish and Wildlife Biologist	PFT	GS 7
Restoration Ecologist	PFT	GS 11
Biology Technician	PFT	GS 5/6/7
Biology Technician	PFT	GS 5/6/7
GIS/Data Management Specialist	PFT	GS 9
Public Use		
*Outdoor Recreation Planner	PFT	GS 11
Outdoor Recreation Planner	PFT	GS 9
*Environmental. Education Specialist (Coordinator)	PFT	GS 9/11
Environmental. Education Specialist (Coordinator)	PFT	GS 9/11
Interpretation & Education Specialist	PFT	GS 9
Visual Information Specialist	PFT	GS 7/9
Volunteer Services Coordinator	PFT	GS 7/9
*Park Ranger	PFT	GS 7
Refuge Officer	PFT	GS 7

Staff Type	Employment Status	Salary Rating
Refuge Officer	PFT	GS 7
<i>Maintenance</i>		
*Maintenance worker	PFT	WG 8
*Maintenance worker	PFT	WG 8
Maintenance worker	PFT	WG 8
Maintenance worker	PFT	WG 5/6
Maintenance worker	PFT	WG 5/6
Maintenance worker	PFT	WG 5/6
Maintenance worker	PFT	WG 5/6
Engineering Equip. Operator	PFT	40429

* Indicates Minimum Critical Staffing, includes Black River Unit needs.

Compatibility Determinations for Proposed Action

- G.1 Recreational Boating
- G.2 Recreational Fishing
- G.3 Waterfowl Hunting
- G.4 Environmental Education
- G.5 Wildlife Observation, Photography, and Interpretation
- G.6 Research
- G.7 Agriculture – Haying

COMPATIBILITY DETERMINATION

(October 2002)

Use: Recreational Boating

Refuge Name: Nisqually National Wildlife Refuge, located in Thurston and Pierce counties, Washington.

Establishing and Acquisition Authority(ies): Nisqually National Wildlife Refuge (NWR) was established on January 22, 1974 with approval by the Migratory Bird Conservation Commission. Approximately 2,925 acres of the approved 3,936 acres have been acquired. Legal authorities used for establishment of the Refuge include: Migratory Bird Conservation Act, as amended (16 U.S.C. 715-715d, 715e, 715f - 715r); and Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a - 742j).

Refuge Purpose(s): Nisqually NWR purposes include:

...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C.-715d).

...for the development, advancement, management, conservation, and protection of fish and wildlife resources ...(16 U.S.C. 742f(a)(4).

... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...16 U.S.C. 742f(b)(1).

National Wildlife Refuge System Mission: “To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (National Wildlife Refuge System Administration Act of 1996, as amended [16 U.S.C. 668dd et seq.]).

Description of Use: Recreational boating use addressed in this compatibility determination includes motorboats and non-motorized boats, including kayaks and canoes, in all waters of the Refuge outside the Brown Farm Dike, including the Research Natural Area (RNA). It does not include personal watercraft (PWC) use. Motor boats include a variety of crafts powered by 2-cycle or 4-cycle engines. Although the Refuge does not closely monitor all boat use that occurs on Refuge waters, approximately 6,700 boats per year are estimated to use the Refuge based on various public use data (USFWS, unpubl. data). Current Thurston County regulations require a 5 mph speed limit for all watercraft within 200 feet of any shoreline. However, this speed limit of 5 mph is currently not enforced by the U.S. Fish and Wildlife Service (Service) and is minimally enforced by the State or County. Pierce County does not have a similar regulation.

The Comprehensive Conservation Plan (CCP) Proposed Action would continue to provide recreational boating opportunities with an emphasis on use supporting priority public uses, including wildlife observation/photography, interpretation, environmental education, waterfowl hunting, and fishing. New restrictions would be aimed at minimizing impacts to wildlife and

habitat as well as conflicts with other users. These restrictions include a seasonal closure (October 1-March 31) in the RNA and a 5 mph speed limit throughout Refuge waters, including portions of the Refuge in Pierce County. This would expand the current 5 mph speed limit within 200 feet of any shoreline (Thurston County regulations) to include all Refuge waters. The area within the Brown Farm Dike and any estuarine restoration area (formerly diked areas) will remain closed to boating. Commercial vendors that lead organized groups will be required to apply for a Refuge Special Use Permit for each trip. A new visitor contact station would be constructed at Luhr Beach if acquisition or development of a cooperative agreement is accomplished with the State.

Uses within the Proposed Expansion Area: Chapters 2 and 3 of the Draft CCP/Environmental Impact Statement (EIS) for Nisqually NWR identify areas in which the Service would seek to acquire land from willing sellers outside of the current Refuge boundary (USFWS 2002). Motorized and non-motorized boating currently occurs in McAllister Creek and the Nisqually River, upstream from the current Refuge boundary, although use is limited, particularly in McAllister Creek, which becomes extremely narrow and shallow in this area. The proposed Refuge boating restrictions described above would be applied to any newly acquired lands or waters.

Availability of Resources: The following funding/annual costs would be required to administer and manage boating activities as described above:

	One-time Costs	Recurring Costs
Maintenance of Parking Area and Ramp (Luhr Beach Boat Ramp)		25K
Visitor Contact Station	15K	1K
Law Enforcement		20K
Survey and posting	15K	
Signs	4K	2K
Outreach, Education, and Monitoring		5K
Administration	<u>5K</u>	<u>5K</u>
TOTAL	\$39K	\$58K

Additional funds would be required to construct, operate, and maintain visitor facilities and interpretive materials (see summary table above). Law enforcement staffing would also be needed. Funding would be sought through the Service budget process. Other sources will be sought through strengthened partnerships, grants, coordination with other law enforcement agencies, and additional Refuge operations funding to support a safe, quality public use program as described above.

Anticipated Impacts of Use: Nisqually NWR provides crucial foraging and resting habitat for wintering migratory birds, including waterfowl, shorebirds, seabirds, and other waterbirds. Recreational boating affects their use in Refuge waters (also see Chapter 4 in the Draft CCP/EIS for Nisqually NWR). Boating activity, both motorized and non-motorized, can alter distribution, reduce use of particular habitats or entire areas by waterfowl and other birds, alter feeding behavior and nutritional status, and cause premature departure from areas (Knight and Cole 1995). More sensitive species may find it difficult to secure adequate food or loafing sites as their preferred habitat becomes fragmented and recreation-related disturbances increase (Skagen

et al. 1991; Pfister et al. 1992). Motorized boats generally have more impact on wildlife than non-motorized boats because motorboats produce a combination of movement and noise (Tuite et al. 1983, Knight and Cole 1995). For example, a significant decrease in the proportion of bald eagles feeding at a site was observed when motorized boating activity occurred within 200 meters of that area in the preceding 30 minutes (Skagen 1980). Motorized boats can also cover a larger area in a relatively short time, in comparison to non-motorized boats. Boating pressure on wintering waterfowl in Germany had reached such a high level that it was necessary to establish larger sanctuaries and implement a seasonal closure on water sports and angling (Bauer et al. 1992).

Even canoes and kayaks can cause significant disturbance effects based on their ability to penetrate into shallower areas of the marsh (Speight 1973, Knight and Cole 1995). In the Ozark National Scenic Riverway, green-backed heron activity declined on survey routes when canoes and boat use increased on the main river channel (Kaiser and Fritzell 1984). Canoes or slow-moving boats have also been observed to disturb nesting great blue herons (Vos et al. 1985). Huffman (1999) found that non-motorized boats within 30 meters of the shoreline in south San Diego Bay caused all wintering waterfowl to flush between the craft and shore. However, compared to motorboats, canoes and kayaks appear to have less disturbance effects on most wildlife species (Jahn and Hunt 1964, Huffman 1999, DeLong 2002).

In Denmark, fast-moving boats were observed to have the greatest impact on red-breasted merganser broods (Kahlert 1994). The presence of fast-moving boats also caused the most significant modifications to the amount of time animals spent feeding and resting. In England, an increased rate of disturbance from boats partly caused a decline in roosting numbers of shorebird species (Burton et al. 1996). In addition, boaters have been observed to cause massive flights of diving ducks on the Mississippi River (Thornburg 1973). Motorized boats within 100 meters of shore caused all wintering waterfowl and shorebirds to flush between the craft and shore in south San Diego Bay, regardless of speed (Huffman 1999). However, disturbance to birds in general was reduced when boats traveled at or below the 5 mph speed limit.

Impacts of boating can occur even at low densities, given their noise, speed, and ability to cover extensive areas in a short amount of time. The total number of boats and people can be an inappropriate measure of recreational intensity because the presence of a single boat might be just as disturbing as that of many (Tuite et al. 1983, Knight and Knight 1984). This is especially the case in the RNA and McAllister Creek, both areas with high waterfowl use. USFWS survey data show that the RNA provides important resting and feeding habitat for large numbers of wintering waterfowl, including many wigeon, the predominant waterfowl species on the Refuge. Typically, the largest waterfowl concentrations are found in the RNA during the winter months.

The habitat along McAllister Creek is a relatively narrow tidal system that receives high use by a variety of waterfowl, wading birds, other waterbirds, and raptors. Because boats in confined areas are generally closer to shorelines, waterbirds in tidal creeks and rivers may be exposed to more human activity than birds in other shoreline habitats (Bratton 1990). Even low levels of boating activity affect the duration and pattern of use by wildlife in this narrow system. In addition, disturbance to nesting birds is caused by boat activity. An active bald eagle nest is located along McAllister Creek. The nesting period identified in the Bald Eagle Recovery Plan identifies January 1 as the beginning of the nesting season when special protective measures should begin (USFWS 1986). A great blue heron nesting colony, located along McAllister Creek since the 1970s, has been declining for several years. Nesting great blue herons are sensitive to a

variety of human disturbances. Great blue herons were one of the more sensitive of 23 waterbird species, when measuring flush distances from motorized watercraft (Rodgers and Schwikert 2002). Washington State requires a minimum 300-m buffer zone to protect colonies from human disturbances (WDFW 2001). However, boating activity in McAllister Creek falls within this buffer zone. Boating activities may be one of the contributing factors affecting these nesting birds.

Motorized boats introduce noise and pollution, in the form of gas and oil in water, and particulates in the air in estuarine and riverine habitats at the Refuge. An EPA report indicates that two-stroke engines, found on many motorized boats, discharge as much as 25% of unspent oil and gas directly into the water. Increased speeds of two-stroke engines can result in greater discharge of unspent oil and gas. Hydrocarbons in gas and oil released from two-stroke engines float on the surface and settle within shallow estuarine habitats. Hydrocarbon pollution has been found to bioaccumulate within the complex food web, posing a serious threat to the marine environment (Tjarnlund et al. 1993). Hydrocarbons can also be transferred to eggs from the plumage of incubating birds. Extremely small amounts of petroleum hydrocarbons can be toxic to eggs and birds that may ingest these contaminants (Hoffman 1989).

Anticipated Impacts of Uses within the Proposed Expansion Area: The following conditions must be met before allowing existing uses to occur on an interim basis on newly acquired lands: (1) There is no indirect, direct, or cumulative threat anticipated to human health or safety; (2) There is no indirect, direct, or cumulative threat anticipated to natural or cultural resources; (3) The use is consistent with management of existing Nisqually NWR lands and would contribute to achieving Refuge goals. In particular, existing Refuge regulations would not be compromised; (4) The newly acquired lands represent a meaningful unit within which to manage the activity; and (5) There are no anticipated conflicts with priority public uses.

The only major waterways within the expansion area are McAllister Creek and the Nisqually River. If property is acquired that includes McAllister Creek or the Nisqually River, boating regulations described above would also apply to these areas. No waterways other than McAllister Creek and Nisqually River will be open to boating. Anticipated impacts would be similar to that described above.

Public Review and Comment: Public review and comments will be solicited in conjunction with distribution of the Draft CCP/EIS for Nisqually NWR.

Following the public review and comment period, comments and actions taken to address comments will be summarized here.

Determination:

Use is Not Compatible

Use is Compatible with the Following Stipulations

Stipulations necessary to ensure compatibility: The following stipulations are required to ensure that motorized and non-motorized boating is compatible:

1. A 5 mph speed limit for all boats will be implemented throughout Refuge waters.
2. The RNA will be closed to boats from October 1 through March 31 to reduce disturbance to wintering waterfowl populations.
3. The estuarine restoration area currently within the Brown Farm Dike (699 acres) will be closed to boats year round to serve as a sanctuary area. No motorized or non-motorized boats will be allowed into this area, and all public access will occur on trails only.
4. Signs will be installed and maintained to mark closed areas, seasonal closures, and to indicate 5 mph speed limit regulations on the Refuge. The RNA boundary will be posted and signs will include seasonal closure dates.
5. Periodic law enforcement will help ensure compliance with speed limit regulations and area closures. Regulations will be described in brochures and posted at a new Visitor Contact Station at Luhr Beach. Coordination with other law enforcement agencies, including the State and County, will be strengthened. Motorboat operators are required to be in compliance with all applicable Refuge, U.S. Coast Guard, and State of Washington laws. Outreach and education efforts will address groups associated with boating in the south Sound.
6. The Service remains concerned about impacts to wildlife using McAllister Creek. Waterfowl and waterbird use, great blue heron, bald eagle, salt marsh habitat, and boat activity will be monitored in McAllister Creek to document impacts. This Compatibility Determination will be re-evaluated in 3 - 5 years or sooner to assess whether other protective measures should be implemented in McAllister Creek.
7. If property is acquired that includes McAllister Creek or the Nisqually River, boating regulations described above would also apply to these areas. No waterways other than McAllister Creek and Nisqually River in the expansion area would be open to boating.
8. Monitoring of boating activities and associated effects on waterfowl, waterbirds, and other migratory birds will be conducted. Monitoring data will be used by the Refuge Manager in the periodic re-evaluation of this Compatibility Determination.

Justification: Boating itself is not considered wildlife-dependent recreation, but many wildlife-dependent recreational activities (fishing, waterfowl hunting, environmental education,

interpretation, and wildlife observation/photography) are associated with boating. Providing opportunities for wildlife-dependent priority public uses would contribute toward fulfilling provisions under the National Wildlife Refuge System Administration Act as amended in 1997. Although boating has a potential to impact wetland wildlife, implementing the prescribed measures listed in the Stipulations section should reduce many of these impacts. It is anticipated that an adequate amount of estuary habitat would be available to the majority of waterfowl and other wetland birds because some high wildlife use areas will be closed to boating, and boating regulations would be maintained and enforced. Thus, it is anticipated that birds will find sufficient food resources and resting places such that their abundance and use of the Refuge will not be measurably lessened, the physiological condition and production of waterfowl and other waterbirds will not be impaired, their behavior and normal activity patterns will not be altered dramatically, and their overall status will not be impaired. The Refuge will also implement a monitoring program to help assess disturbance effects on wildlife and habitat. Improved outreach and educational information for Refuge visitors involved in activities associated with boating would also help to reduce the impacts associated with boating activities.

Mandatory Re-Evaluation Date (provide month and year for “allowed” uses only):

_____ Mandatory 15-year Re-Evaluation (for priority public uses)

X Mandatory 10-year Re-Evaluation, Date to be provided in Final EIS/CCP (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision (check one below):

___ Categorical Exclusion without Environmental Action Statement

___ Categorical Exclusion and Environmental Action Statement

___ Environmental Assessment and Finding of No Significant Impact

X Environmental Impact Statement and Record of Decision

Refuge Determination

Prepared by:

(Signature)

(Date)

Refuge Manager/
Project Leader
Approval:

(Signature)

(Date)

Concurrence

Refuge Supervisor:

(Signature)

(Date)

Regional Chief,
National Wildlife
Refuge System:

(Signature)

(Date)

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COMPATIBILITY DETERMINATION

(October 2002)

Use: Recreational Fishing (bank, boat and shellfishing)

Refuge Name: Nisqually National Wildlife Refuge, located in Thurston and Pierce counties, Washington.

Establishing and Acquisition Authority(ies): Nisqually National Wildlife Refuge (NWR) was established on January 22, 1974 with approval by the Migratory Bird Conservation Commission. Approximately 2,925 acres of the approved 3,936 acres have been acquired. Legal authorities used for establishment of the Refuge include: Migratory Bird Conservation Act, as amended (16 U.S.C. 715-715d, 715e, 715f - 715r); and Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a - 742j).

Refuge Purpose(s): Nisqually NWR purposes include:

...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C.-715d).

...for the development, advancement, management, conservation, and protection of fish and wildlife resources ...(16 U.S.C. 742f(a)(4).

... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...16 U.S.C. 742f(b)(1).

National Wildlife Refuge System Mission: “To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (National Wildlife Refuge System Administration Act of 1996, as amended [16 U.S.C. 668dd et seq.]).

Description of Use: Currently, recreational fishing occurs in McAllister Creek, in the Nisqually River, and on the tideflats at the mouth of McAllister Creek and north of the Brown Farm Dike. Boat launch sites providing access to McAllister Creek and Nisqually River are primarily from the Luhr Beach Boat Ramp, but also include other launching facilities in southern Puget Sound. The Refuge offers a walk-in bank fishing area along McAllister Creek. Anglers must pay the Refuge entrance fee and hike approximately $\frac{3}{4}$ mile on the Refuge trail to the designated fishing area. Illegal access occurs frequently at the southern boundary of the Refuge, where McAllister Creek flows under I-5. Some fishing activity also occurs at a pier located at the Luhr Beach boat ramp. Fish caught by Refuge visitors primarily include chinook and chum salmon, but also some cutthroat and steelhead. Although the Refuge does not closely monitor all fishing on the Refuge, use is estimated to be approximately 3,800 anglers per year based on various public use data. During low spring and summer tides, shellfishers access the Refuge and State tideflats from Luhr Beach. Although the intertidal area at the mouth of McAllister Creek has been closed to shellfishing due to elevated levels of fecal coliform bacteria since 2000, this closure is not enforced and some shellfishing does still occur.

The CCP Proposed Action would continue to provide fishing opportunities from boats in the Nisqually River and McAllister Creek. The Research Natural Area (RNA) would be posted closed to fishing and the closure enforced to comply with Refuge RNA policy. However, since estuarine restoration along McAllister Creek would remove the dike on which the current bank fishing occurs, this fishing area will no longer be available. The Service would investigate the feasibility of establishing a new bank fishing area along the east bank of the Nisqually River, north of I-5, on Nisqually Indian Tribal and Refuge property. The development of this site would need to be coordinated with the development of a trail system and visitor contact station/parking area located in the uplands above this property. The Refuge would also investigate fishing opportunities for disabled users at Luhr Beach and along the Nisqually River.

Shellfishing will remain closed in the tideflats as directed by the Washington State Department of Health. The Refuge would re-evaluate this compatibility determination if recreational shellfishing is opened in the future because of improved water quality.

Uses within the Proposed Expansion Area: Chapters 2 and 3 of the Draft CCP/EIS for the Nisqually NWR identify areas in which the Service would seek to acquire land from willing sellers outside of the current Refuge boundary (USFWS 2002).

There are several public recreational fishing sites in the proposed expansion area. The majority of fishing use occurs on the Nisqually River accessed from Fort Lewis property (Trotter's Woods) on the east side of the river or from a State owned (WDFW) bank fishing site on the west side of the river. This WDFW site was designed to be completely accessible; however, changes in the river have made this site less usable. The numbers of anglers using these sites are not known, but observations indicate very heavy use when salmon runs are occurring. The remote nature of these sites and the low level of enforcement have resulted in high amounts of fishing litter and debris at some of these sites. Use in the Trotter's Woods area is largely unregulated, and evidence of habitat deterioration from vehicle use and extensive litter exists in this riparian forest. If Trotter's Woods is managed by the Service through acquisition or a cooperative management agreement, the area will be managed to reduce habitat damage and improve the fishing program. This includes development of a parking area, improved vehicle traffic management within the forested areas, and riparian restoration. In addition, bank fishing opportunities south of I-5 on McAllister Creek would be established, if appropriate parcels are acquired, to replace the site (north of I-5) that will be lost due to dike removal for estuarine restoration.

The CCP Proposed Action in the expansion area is to provide quality fishing opportunities by maintaining selected traditional bank fishing and water access sites, improve facilities, and close other sites to protect habitat values, for example, limiting vehicle access in sensitive riparian habitats. Location criteria for new sites considered will be accessibility, feasibility, minimal conflicts with other users, maintenance, compatibility, wildlife and habitat disturbance potential, and potential to promote a quality fishing experience.

Availability of Resources: The following funding/annual costs would be required to administer and manage fishing activities as described above:

	One-time Cost	Recurring Cost
Bank fishing area (development, eastside)	18K	
Law Enforcement		35K
Posting/signing	16K	2K
Outreach, Education, and Monitoring	3K	5K
Development of Accessible Sites (Luhr Beach, Nisqually River)	60K	3K
Development and maintenance of Trotter’s Woods Site	50K	15K
Maintenance of Parking Area		10K
Administration	<u>18K</u>	<u>5K</u>
TOTAL	\$165K	\$75K

Additional funds would be required to construct, operate, and maintain visitor facilities and interpretive materials. Law enforcement staffing would also be needed. Funding would be sought through the Service budget process. Other sources will be sought through strengthened partnerships, grants, coordination with other law enforcement agencies, and additional Refuge operations funding to support a safe, quality public use program as described above.

Anticipated Impacts of Use: Fishing as a solitary and stationary activity tends to be less disturbing to wildlife than hunting or motorized boating (Tuite et al. 1983). It is well recognized that fishing can give many people a deeper appreciation of fish and wildlife and a better understanding of the importance of conserving habitat, which has ultimately contributed to the Refuge System mission. Furthermore, despite the potential impacts of fishing, a major goal of Nisqually NWR is to provide opportunities for wildlife-dependent recreation. Fishing is one of the six priority public uses on the National Wildlife Refuge System. Of key concern then, is to manage the activity to keep adverse impacts to within acceptable limits.

Angler activities while on Refuge are and will remain consistent with State guidelines. Harvest-related impacts for fish stocks associated with sportfishing in the Nisqually River and McAllister Creek are estimated annually and taken into consideration by the State in their development of annual pre-season fishing agreements and associated regulations. Therefore, impacts to fish populations should be minimized.

Additional disturbance would be caused to birds and other wildlife using the open waters and rivers/creeks where fishing would occur. Fishing activities may influence the composition of bird communities, as well as distribution, abundance, and productivity of waterbirds (Tydeman 1977, Bouffard 1982, Bell and Austin 1985, Bordignon 1985, Edwards and Bell 1985, and Cooke 1987). Anglers often fish in shallow, sheltered bays and creeks that birds prefer, negatively impacting distribution and abundance of waterfowl, grebes, and coots (Cooke 1987). Increases in anglers and associated shoreline activity discouraged waterfowl from using otherwise suitable habitat (Jahn and Hunt 1964). In Britain, anglers displaced waterfowl from

their preferred feeding and roosting areas and caused wigeon, green-winged teal, pochard, and mallard to depart from a reservoir prematurely (Jahn and Hunt 1964). Anglers influenced the numbers, behavior, and diurnal distribution of avian scavengers present at sites in Washington, when compared to non-fishing days (Knight et al. 1991). Shoreline activities, such as human noise, would cause some birds to flush and go elsewhere. In addition, trampling of vegetation and deposition of sewage or other chemicals are expected to commonly occur (Liddle and Scorgie 1980). Disturbance and destruction of riparian vegetation, bank stability, and water quality may result from high levels of bank fishing activities.

Boating associated with fishing can alter bird distribution, reduce use of particular habitats or entire areas by waterfowl and other waterbirds, alter feeding behavior and nutritional status, and cause premature departure from areas (Knight and Cole 1995). Impacts of motorized boating can occur even at low densities, given their noise, speed, and ability to cover extensive areas in a short amount of time. This is especially the case in the RNA and McAllister Creek, both areas with high waterfowl use. The habitat along McAllister Creek is a relatively narrow tidal system that receives high use by a variety of waterfowl, waterbirds, wading birds, and raptors. In addition, an active bald eagle nest is located along McAllister Creek. The nesting period identified in the Bald Eagle Recovery Plan identifies January 1 as the beginning of the nesting season when special protective measures should begin (USFWS 1996). A great blue heron nesting rookery has been located along McAllister Creek for several years, with nesting activity beginning as early as February. Washington State requires a minimum 300-meter buffer zone to protect colonies from human disturbances (WDFW 2001). Boating activity in this area would affect the duration and pattern of use by wildlife in this narrow system (see Compatibility Determination for “Recreational Boating”).

If recreational shellfish harvest activity is re-opened at the mouth of McAllister Creek, it will be managed consistent with State guidelines. Harvest-related impacts to shellfish stocks are estimated annually and taken into consideration by the State in their development of annual seasonal harvest dates and allowances. Therefore, impacts to shellfish populations should be reduced. However, activity associated with shellfishing may result in disturbance to the habitat caused by foot traffic and digging activity on mudflats, aquatic plants, and nearby salt marshes. Additional disturbances would occur as described above associated with fishing activity.

Anticipated Impacts from Uses within the Proposed Expansion Area: The following conditions must be met before allowing existing uses to occur on an interim basis on newly acquired lands: (1) There is no indirect, direct, or cumulative threat anticipated to human health or safety; (2) There is no indirect, direct, or cumulative threat anticipated to natural or cultural resources; (3) The use is consistent with management of existing Nisqually NWR lands and would contribute to achieving Refuge goals. In particular, existing Refuge regulations would not be compromised; (4) The newly acquired lands represent a meaningful unit within which to manage the activity; and (5) There are no anticipated conflicts with priority public uses.

Anticipated impacts from fishing in the expansion area would be the same as described above.

Public Review and Comment: Public Review and comments will be solicited in conjunction with distribution of the draft CCP/Environmental Impact Statement for Nisqually NWR. Following the public review and comment period, comments and actions taken to address comments will be summarized here.

Determination:

Use is Not Compatible

Use is Compatible with the Following Stipulations

Stipulations necessary to ensure compatibility: Sanctuary areas will be designated to provide high quality habitat for feeding, resting, breeding, and thermal protection for waterfowl and other wildlife species. The RNA, a mixture of nearshore, intertidal, and salt marsh habitat, will be closed to fishing year round and to boating from October 1 to March 31. In addition, the restored estuarine area will be closed to fishing and other public use activities, except for wildlife observation from trails at the edges, to allow undisturbed research and monitoring of wildlife and habitat response to restoration activities. Some of the freshwater units will serve as sanctuary for waterfowl that prefer to move between the estuary and freshwater wetlands.

Boating associated with fishing has high potential for adversely impacting wildlife in the estuary. Three factors that exert the most disturbance to wildlife due to boating are noise, speed, and significantly increased access to more parts of the estuary. Thus, boating regulations to ensure compatibility during the fishing season will include the following: (1) 5 mph speed limit for boats in all Refuge waters; (2) the RNA will be closed to boats from October 1 through March 31 to reduce disturbance to wintering waterfowl populations; and (3) the estuarine restoration area currently within the Brown Farm Dike will be closed to boats year round. No motorized or non-motorized boats will be allowed into this area and all public access will occur on trails only. Signs will be installed to mark closed areas. The Refuge remains concerned about impacts to wildlife using McAllister Creek. Monitoring would be conducted to ensure that these stipulations are sufficient to minimize disturbance to wildlife.

The Refuge will provide information on fishing and shellfishing regulations at the Luhr Beach boat ramp, Visitor Contact Stations, and through printed brochures. Information will also include current migratory bird and Refuge regulations, and maps of closed areas. Refuge officers will enforce closed areas and boat speed limits. The Refuge will monitor and evaluate the fishing program and users to determine if objectives are being met.

Justification: Recreational fishing is one of the six priority public uses of the National Wildlife Refuge System. Providing a quality fishing program contributes to achieving one of the Refuge's goals. This program as described was determined to be compatible despite the potential impacts that fishing and supporting activities (boating) can have on the Service's ability to achieve Refuge purposes. Sufficient restrictions will be placed on fishing, boating, and other public uses to ensure that an adequate amount of high quality feeding, breeding, and resting habitat would be available for migratory birds in relatively undisturbed areas (sanctuaries). Although boating has the greatest potential to impact wetland wildlife, implementing the prescribed measures listed in the Stipulations section should reduce many of these impacts. In addition, the majority of waterfowl use on the Refuge occurs in the winter and spring months, with some birds arriving as early as September and October. Since the majority of the fishing activity occurs in the summer and fall (through mid-October), disturbance to waterfowl species is reduced.

It is anticipated that an adequate amount of estuary, open water, and riverine habitat would be available to the majority of waterfowl, waterbirds, and other wildlife because: (1) some high

wildlife use areas will be set aside as sanctuary; (2) new boating regulations would be implemented and enforced; and (3) bank fishing activity will be confined to designated areas and enforced. Thus, it is anticipated that wildlife, primarily waterbirds, will find sufficient food resources and resting places such that their abundance and use of the Refuge will not be measurably lessened, fishing pressure will not cause fish stocks to decline, the physiological condition and production of waterfowl and other waterbirds will not be impaired, their behavior and normal activity patterns will not be altered dramatically, and their overall welfare will not be impaired. A program will be implemented to monitor some of these factors.

Mandatory Re-Evaluation Date (provide month and year for “allowed” uses only):

Mandatory 15-year Re-Evaluation Date to be provided in Final EIS/CCP (for priority public uses)

Mandatory 10-year Re-Evaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision (check one below):

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Refuge Determination

Prepared by:

_____ (Signature)

_____ (Date)

Refuge Manager/
Project Leader

Approval:

_____ (Signature)

_____ (Date)

Concurrence

Refuge Supervisor:

_____ (Signature)

_____ (Date)

Regional Chief,
National Wildlife
Refuge System:

_____ (Signature)

_____ (Date)

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- WDFW (Washington Department of Fish and Wildlife). 2001. Priority species and habitats list. Available at: <http://www.wa.gov/wdfw/hab/phsvert.htm#birds>.

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COMPATIBILITY DETERMINATION

(October 2002)

Use: Waterfowl Hunting

Refuge Name: Nisqually National Wildlife Refuge, located in Thurston and Pierce counties, Washington.

Establishing and Acquisition Authority(ies): Nisqually National Wildlife Refuge (NWR) was established on January 22, 1974 with approval by the Migratory Bird Conservation Commission. Approximately 2,925 acres of the approved 3,936 acres have been acquired. Legal authorities used for establishment of the Refuge include: Migratory Bird Conservation Act, as amended (16 U.S.C. 715-715d, 715e, 715f - 715r); and Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a - 742j).

Refuge Purpose(s): Nisqually NWR purposes include:

...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C.-715d).

...for the development, advancement, management, conservation, and protection of fish and wildlife resources ...(16 U.S.C. 742f(a)(4).

... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...16 U.S.C. 742f(b)(1).

National Wildlife Refuge System Mission: “To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (National Wildlife Refuge System Administration Act of 1996, as amended [16 U.S.C. 668dd et seq.]).

Description of Use: Nisqually NWR lands are not open to waterfowl hunting. Waterfowl hunting is allowed on 617 acres of WDFW lands within the approved Refuge boundary. Due to the irregular shape and scattered locations of these inholdings, and difficulty in posting and maintaining boundary signs, unauthorized hunting occurs on up to 1,189 acres of adjacent Refuge lands. This hunting activity has been considered administratively uncontrollable, so where signing is absent, hunting closures have not been enforced. Since the unauthorized hunting occurs on 63% of the estuarine habitat within the Refuge, including the Research Natural Area (RNA), current hunting activity provides insufficient sanctuary for estuarine-dependent wildlife and allows an unauthorized use to continue on large parts of the Refuge.

The CCP Proposed Action includes formally opening a total of approximately 191 acres of waters and tideflats of Nisqually NWR lands to waterfowl hunting (USFWS 2002). These lands are contiguous with the WDFW parcel north of the Brown Farm Dike. The RNA boundary will be moved to the east to provide high quality hunting area at the mouth of the River, reducing the RNA by 73 acres. By opening 191 acres of the Refuge to waterfowl hunting, the hunting area

north of the Brown Farm Dike will be configured in a single rectangular block, greatly reducing confusing boundary issues. Areas designated as “No Hunting Areas” will be posted and enforced, eliminating the unauthorized hunting that has occurred on the Refuge in the past. Waterfowl hunting will continue on all WDFW lands. A 25-shell limit will be instituted on Refuge and WDFW lands. WDFW will continue to have jurisdiction and management responsibility over WDFW lands, and the Service will manage the hunting program on Refuge lands. Hunting will be allowed consistent with annual State hunting regulations and seasons, and will be permitted by boat access only in the posted Refuge hunt area. The area within the Brown Farm Dike, including the estuarine restoration area, will remain closed to hunting. The waterfowl hunting season generally falls within the period from October through January. There will be no limit on the number of hunters, hunt days, and no designated blind sites. The State will manage their own hunt program on WDFW lands.

Uses within the Proposed Expansion Area: Chapters 2 and 3 of the Draft CCP/EIS for Nisqually NWR identify areas in which the Service would seek to acquire land from willing sellers outside of the current Refuge boundary (USFWS 2002). Some private hunting occurs on property within the expansion area. The Medicine Creek Hunt Club consists of a small number of hunters using private property south of I-5. Waterfowl hunting also takes place in Trotter’s Woods by approximately 3-4 hunters. Should these areas be acquired by the Service, the Refuge would consider allowing walk-in waterfowl hunting with set blinds if sufficient lands have been acquired to allow for adequate wildlife sanctuary and minimal conflicts with other priority public uses. This Compatibility Determination will be updated in the future to include walk-in hunting in the expansion area.

Availability of Resources: The following funding/annual costs would be required to administer and manage waterfowl hunting activities as described above:

	One-time Cost	Recurring Cost
Survey and Post	75K	10K
Maintenance of Parking Area		10K
Law Enforcement		20K
Administration	25K	15K
Outreach, Education, and Monitoring	<u>15K</u>	<u>10K</u>
 TOTAL	 \$115K	 \$65K

Additional funds would be required to construct, operate, and maintain a hunt program, visitor facilities, and interpretive materials. Law enforcement staffing would be needed. Funding would be sought through the Service budget process. Other sources will be sought through strengthened partnerships, grants, and additional Refuge operations funding to support a safe, quality public use program as described above.

Anticipated Impacts of Use: By its very nature, waterfowl hunting has very few if any positive effects on waterfowl and other birds while the activity is occurring, but it is well recognized that this activity has given many people a deeper appreciation of wildlife and a better understanding of the importance of conserving their habitat, which has ultimately contributed to the Refuge System mission. Furthermore, despite the potential impacts of hunting, a goal of Nisqually NWR is to provide opportunities for quality wildlife-dependent recreation. By law, hunting is one of

the six priority public uses of the National Wildlife Refuge System. Of key concern is to offer a safe and quality program and to maintain adverse impacts within acceptable limits.

Although hunting directly impacts individuals, the amount of waterfowl harvest is not expected to have a measurable effect on Refuge populations, especially since waterfowl hunting activity is not extremely high in the delta. For example, the average hunter visit per day was 8.4 during the 1998/99 season (USFWS unpublished data). Hunting may be either compensatory or additive to natural mortality (Anderson 1995). Compensatory mortality occurs when hunting substitutes for other forms of mortality (disease, competition, predation, severe weather, etc.). Additive mortality occurs when hunting compounds the total mortality. In some cases, hunting can be used as a management tool to control populations. In concert with Canada, Mexico, and multi-state Flyway councils, the Service and WDFW regulate hunting so that harvest does not reduce populations to unsustainable levels.

Direct effects of hunting on waterfowl are mortality, wounding, and disturbance (DeLong 2002). Hunting can alter behavior (e.g., foraging time), population structure, and distribution patterns of wildlife (Owens 1977, Raveling 1979, White-Robinson 1982, Thomas 1983, Bartelt 1987, Madsen 1985, and Cole and Knight 1990). In Denmark, hunting was documented to affect the diversity and number of birds using a site (Madsen 1995). Avian diversity changed from predominantly mute swan and mallard to a more even distribution of a greater number of species when a sanctuary was established. Hence, species diversity increased with the elimination of hunting. There also appears to be an inverse relationship between the numbers of birds using an area and hunting intensity (DeLong 2002). In Connecticut, lesser scaup were observed to forage less in areas that were heavily hunted (Cronan 1957). In California, the numbers of northern pintails on Sacramento NWR non-hunt areas increased after the first week of hunting and remained high until the season was over in early January (Heitmeyer and Raveling 1988). Following the close of hunting season, ducks generally increased their use of the hunt area; however, use was lower than before the hunting season began.

Human disturbance to wintering birds and other wildlife using the open waters and marshes on the Nisqually delta would occur as a result of hunting activity. Migratory and wintering waterfowl generally attempt to minimize time spent in flight and maximize foraging time because flight requires considerably more energy than any other activity, other than egg laying. Human disturbance associated with hunting includes loud noises and rapid movements, such as those produced by shotguns and boats powered by outboard motors. This disturbance, especially when repeated over a period of time, compels waterfowl to change food habits, feed only at night, lose weight, or desert feeding areas (Belanger and Bedard 1995, Madsen 1995, Wolder 1993). Disturbance levels from hunting activity outside Chincoteague NWR were found to be high enough to force wintering black ducks into a pattern of nocturnal feeding within surrounding salt marsh and diurnal resting within Refuge impoundments (Morton et al. 1989a, 1989b). Unhunted populations have been documented to behave differently from hunted ones (Wood 1993).

These impacts can be reduced by the presence of adjacent sanctuary areas where hunting does not occur, and birds can feed and rest relatively undisturbed. Sanctuaries or non-hunt areas have been identified as the most common solution to disturbance problems caused from hunting (Havera et. al 1992). Prolonged and extensive disturbances may cause large numbers of waterfowl to leave disturbed areas and migrate elsewhere (Madsen 1995, Paulus 1984). In Denmark, hunting disturbance effects were experimentally tested by establishing two sanctuaries

(Madsen 1995). Over a 5-year period, these sanctuaries became two of the most important staging areas for coastal waterfowl. Numbers of dabbling ducks and geese increased 4 to 20 fold within the sanctuary (Madsen 1995). Thus sanctuary areas are very important to minimize disturbance to waterfowl populations to ensure their continued use of the Nisqually delta.

Intermittent hunting can be a means of minimizing disturbance, especially if rest periods in between hunting events are weeks rather than days (Fox and Madsen 1997). It is common for Refuges to manage hunt programs with non-hunt days. At Sacramento NWR, 3-16% of pintails were located on hunted units during non-hunt days, but were almost entirely absent in those same units on hunt days (Wolder 1993). In addition, northern pintails, American wigeon, and northern shovelers decreased time spent feeding on days when hunting occurred on public shooting areas, as compared to non-hunt days (Heitmeyer and Raveling 1988). However, intermittent hunting may not always greatly reduce hunting impacts. The intermittent hunting program of three hunt days per week at Sacramento NWR results in lower pintail densities on hunt areas during non-hunt days than non-hunt areas (Wolder 1993). In Germany, several studies reported a range from a few days to approximately three weeks for waterbird numbers to recover to pre-disturbance levels (Fox and Madsen 1997). The proposed hunt program at Nisqually NWR will not be intermittent in order to provide consistent management with the existing program on adjacent WDFW lands and waters, preventing confusion among hunters on the delta.

Boating activity associated with hunting during the fall and winter can alter distribution, reduce use of particular habitats or entire areas by waterfowl and other birds, alter feeding behavior and nutritional status, and cause premature departure from areas (Knight and Cole 1995). In the upper Midwest, motor boating and hunting have been found to be the two main activities that disturb waterfowl (Korschgen et al. 1985). In Connecticut, selection of feeding sites by lesser scaup was influenced by disturbances from hunters, anglers, and pleasure boaters (Cronan 1957). In Germany, boating pressure on wintering waterfowl had reached such a high level that it was necessary to establish larger sanctuaries, implement a seasonal closure on water sports and angling, and impose a permanent ban on hunting (Bauer et al. 1992). Impacts of boating can occur even at low densities, given their noise, speed, and ability to cover extensive areas in a short amount of time. This is especially important in the RNA and McAllister Creek. These are both areas with high waterfowl use. The habitat along McAllister Creek is a relatively narrow tidal system that receives high use by a variety of waterfowl, waterbirds, wading birds, and raptors. In addition, an active bald eagle nest is located along McAllister Creek. The nesting period identified in the Bald Eagle Recovery Plan identifies January 1 as the beginning of the nesting season when special protective measures should begin (USFWS 1986). A great blue heron nesting colony, located along McAllister Creek since the 1970s, has been declining for several years. Nesting great blue herons are sensitive to a variety of human disturbances. Washington State requires a minimum 300-meter buffer zone to protect colonies from human disturbances (WDFW 2001). It is possible that hunting and associated boating activities may be one of the contributing factors affecting these nesting birds, as well as other wildlife using this narrow system.

Additional impacts from hunting activity include conflicts with individuals participating in wildlife-dependent priority public uses, such as canoers, kayakers, and other wildlife observers. The Refuge has received numerous comments from canoers and kayakers indicating concern for their safety while boating during the waterfowl hunting season.

Anticipated Impacts of Uses within the Proposed Expansion Area: The following conditions must be met before allowing existing uses to occur on an interim basis on newly acquired lands: (1) There is no indirect, direct, or cumulative threat anticipated to human health or safety; (2) There is no indirect, direct, or cumulative threat anticipated to natural or cultural resources; (3) The use is consistent with management of existing Nisqually NWR lands and would contribute to achieving Refuge goals. In particular, existing Refuge regulations would not be compromised; (4) The newly acquired lands represent a meaningful unit within which to manage the activity; and (5) There are no anticipated conflicts with priority public uses.

Anticipated impacts associated with a new walk-in hunting program would be addressed in the updated Compatibility Determination to be developed in the future.

Public Review and Comment: Public review and comments will be solicited in conjunction with the CCP/EIS for Nisqually NWR. Following the public review and comment period, comments and actions taken to address comments will be summarized here.

Determination:

Use is Not Compatible

Use is Compatible with the Following Stipulations

Stipulations necessary to ensure compatibility: Refuge hunt programs will be designed to provide high quality experiences. A quality hunt experience means that: (1) hunters are safe; (2) hunters exhibit high standards of ethical behavior; (3) hunters are provided with uncrowded conditions; (4) hunters have reasonable harvest opportunities; (5) hunters are clear on which areas are open and closed to hunting; and (6) minimal conflicts occur between hunters and other visitors, especially those engaging in wildlife-dependent priority public uses. The 7-day per week hunt program proposed on the Refuge would include the following restrictions to reduce impacts: (1) a limited hunting area (area will be posted and enforced); (2) a 25-shell limit; (3) redefining and reducing the RNA by 73 acres to allow for hunting at the mouth of the Nisqually River; (4) a 200-yard buffer from trails; (5) sufficient feeding and resting habitat for waterfowl in areas closed to hunting (sanctuary); and (6) periodic biological and social monitoring and evaluation of hunting program, including feedback from users to determine if objectives are being met.

Sanctuary areas must provide high quality habitat for feeding, resting, and thermal protection. Since the waterfowl hunt in the delta is focused in estuarine habitat, it is important that sufficient estuarine habitat on the Refuge be set aside as sanctuary. The RNA (764 acres), a mixture of nearshore, intertidal, and salt marsh habitat, will be closed to all consumptive uses year-round and boating during the waterfowl hunting season (October 1 - March 31) to provide this sanctuary. Estuarine habitat within McAllister Creek will also be closed to hunting. The newly restored estuarine area (699 acres) will be closed to public access to ensure successful restoration and to allow undisturbed research and monitoring to evaluate wildlife and habitat response to restoration activities. This area thus will also serve as a sanctuary site. The majority of the remaining diked area (263 areas) will serve as sanctuary for waterfowl that prefer to move

between the estuary and freshwater wetlands. Some of the freshwater units would include public access on trails and therefore would not function as complete sanctuary. Monitoring must demonstrate that sanctuary units are functional, including receiving significant daytime use by waterfowl throughout the hunting season.

Boating associated with hunting has high potential for adversely impacting wildlife in the estuary. Three factors that exert the most disturbance to wildlife due to boating are noise, speed, and significantly increased access to more parts of the estuary. Thus, boating regulations to ensure compatibility during the hunting season will include the following: (1) 5 mph speed limit for boats in all Refuge waters; (2) the RNA will be closed to boats from October 1 through March 31 to reduce disturbance to wintering waterfowl populations; and (3) the estuarine restoration area currently within the Brown Farm Dike will be closed to boats year round. No motorized or non-motorized boats will be allowed into this area and all public access will occur on trails only. Monitoring would be conducted to evaluate whether these stipulations are sufficient to minimize disturbance to wildlife.

Hunter compliance with current migratory bird and Refuge regulations would be achieved through a combination of printed information, signing, outreach efforts, and enforcement of regulations by Refuge officers.

Justification: Waterfowl hunting is one of the six priority public uses of the National Wildlife Refuge System. Providing a quality hunting program contributes to achieving one of the Refuge goals. This program as described was determined to be compatible, in view of the potential impacts that hunting and supporting activities (boating) can have on the Service's ability to achieve Refuge purposes and goals. The Refuge would be opened to waterfowl hunting, with sufficient restrictions in place on hunting, boating, and other public uses to ensure that an adequate amount of high-quality feeding and resting habitat would be available in relatively undisturbed areas (sanctuaries) for the majority of waterfowl and other wetland birds using Nisqually NWR. Although boating has the greatest potential to impact wetland wildlife, implementing the prescribed measures listed in the Stipulations section and in the Recreational Boating Compatibility Determination should reduce major impacts to acceptable levels.

Refuge hunt programs are designed to provide high quality experiences. In general, hunting on Refuges should be superior to that available on other private or public lands, which may require special restrictions (Refuge Manual 8RM5). Measures are often used to ensure quality, including limited hunt days and shell limits and using buffers for public use trails eliminating the need for seasonal trail closures. The limited hunt program is proposed on the Refuge to accomplish the following: (1) accommodate the existing hunt program on WDFW lands; (2) establish consistent regulations across all lands and waters within the Nisqually delta; (3) provide a quality hunting experience that meets Refuge guidelines and policies; and (4) provide sufficient waterfowl sanctuary and resolve the current unauthorized hunting situation.

It is anticipated that an adequate amount of quality, non-hunted estuarine habitat would be available to the majority of waterfowl and other wetland birds because: (1) some high wildlife use areas will be set aside as sanctuary (764 acres in the RNA and 699 acres of restored estuarine area); (2) boating regulations would be maintained and enforced; and (3) hunting activity will be confined to

designated areas because “no hunting zones” will be posted and enforced. Consolidation of the hunting area into a single block of land provides a distinct, manageable unit that can be more easily delineated, posted, and enforced, resulting in larger sections of estuary in the delta that are available for waterfowl use. Thus, it is anticipated that birds will find sufficient food resources and resting places such that their abundance and use of the Refuge will not be measurably lessened, hunting pressure will not cause premature departure from the area, the physiological condition and production of waterfowl and other waterbirds will not be impaired, their behavior and normal activity patterns will not be altered dramatically, and their overall status will not be impaired. A program will be implemented to monitor waterfowl population numbers and habitat use.

Mandatory Re-Evaluation Date (provide month and year for “allowed” uses only):

Mandatory 15-year Re-Evaluation Date will be provided in the Final EIS/CCP (for priority public uses)

Mandatory 10-year Re-Evaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision (check one below):

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Refuge Determination

Prepared by: _____
(Signature) (Date)

Refuge Manager/
Project Leader

Approval: _____
(Signature) (Date)

Concurrence

Refuge Supervisor: _____
(Signature) (Date)

Regional Chief,
National Wildlife
Refuge System:

_____ (Signature) (Date)

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COMPATIBILITY DETERMINATION

(October 2002)

Use: Environmental Education

Refuge Name: Nisqually National Wildlife Refuge, located in Thurston and Pierce counties, Washington.

Establishing and Acquisition Authority(ies): Nisqually National Wildlife Refuge (NWR) was established on January 22, 1974 with approval by the Migratory Bird Conservation Commission. Approximately 2,925 acres of the approved 3,936 acres have been acquired. Legal authorities used for establishment of the Refuge include: Migratory Bird Conservation Act, as amended (16 U.S.C. 715-715d, 715e, 715f - 715r); and Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a - 742j).

Refuge Purpose(s): Nisqually NWR purposes include:

...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C.-715d).

...for the development, advancement, management, conservation, and protection of fish and wildlife resources ...(16 U.S.C. 742f(a)(4).

... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...16 U.S.C. 742f(b)(1).

National Wildlife Refuge System Mission: “To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (National Wildlife Refuge System Administration Act of 1996, as amended [16 U.S.C. 668dd et seq.]).

Description of Use: Currently, the environmental education program at Nisqually NWR serves 5,000 students a year. The environmental education program is designed to provide effective resources, tools, and training which facilitates the teaching of accurate scientific and environmental information about the Nisqually River watershed, Delta, and surrounding areas. The environmental education program works with students and educators to foster an understanding of and appreciation for resource management, the human impacts on wildlife habitats, and to encourage active participation in resource protection.

With a full-time environmental education staff, up to 15,000 students a year will participate in the Refuge environmental education program. Educators will attend a teacher orientation and will design, schedule, and run their own field trips on the Refuge. Refuge staff will provide teacher training, site-specific curricula, materials, and activities, and field trip assistance to enhance learning in an outdoor setting. The temporary Education Center, or new education facility, will be the focus area of the education program. Environmental education study sites in the area of the Twin Barns Loop Trail will provide areas for more in-depth study. Students and

teachers will participate in restoration and monitoring activities through one-time activities or more long-term monitoring studies.

Uses within the Proposed Expansion Area: Chapters 2 and 3 of the Draft CCP/EIS for Nisqually NWR identify areas in which the Service would seek to acquire land from willing sellers outside of the current Refuge boundary (USFWS 2002). The Refuge would acquire from or develop a cooperative management agreement with WDFW to cooperatively manage the Luhr Beach area and Nisqually Reach Nature Center. Because of similar objectives, the education program at the Nisqually Reach Nature Center would be incorporated into the Refuge environmental education program through a cooperative agreement, providing an even stronger program for educating the public on the marine resources of the Nisqually Delta.

As property is acquired south of I-5 and on the East Bluff, each parcel will be reviewed to determine whether it may be incorporated into the existing Refuge environmental education program. The Refuge environmental education program will continue to focus within the Environmental Education Center and Twin Barns Loop Trail areas. However, future environmental education opportunities on newly acquired lands will include student and teacher participation in habitat restoration and monitoring activities that would be incorporated into the overall program. This compatibility determination will be re-evaluated if new activities in the expansion area are anticipated to significantly change the level of use.

Availability of Resources: The following funding/annual costs would be required to administer and manage environmental education activities as described above:

	One-Time Cost	Recurring Cost
Construct and Outfit Education Center	1,300K	
Establish Study Sites	45K	
Maintenance and operation of Education Center, Maintenance of study sites		35K
Staffing (teacher training, student support, curriculum development, administration)		150K
Equipment, materials, and supplies	<u>100K</u>	<u>15K</u>
TOTAL	\$1,445K	\$200K

Funds are anticipated to be available through the Service budget process for construction of a new education center, establishment of study sites, and potentially some operational costs. Additional funding for staffing and operational costs would be needed. Other sources will be sought through strengthened partnerships, grants, and additional Refuge operations funding to support a safe, quality environmental education program as described above.

Anticipated Impacts of Use: The environmental education program would use existing public facilities including parking areas, the Visitor Center, trails, observation platforms and overlooks, and the temporary Education Center. Direct impact to wildlife would occur, as with any group along the trail, if birds (mostly songbirds and waterfowl) near the trail are disturbed. This disturbance is considered to be of minimal impact because: (1) the total number of students

permitted through the reservation system is limited to 100 per day; (2) students and teachers will be instructed in trail etiquette and the best ways to view wildlife with minimal disturbance; (3) education groups will be required to have a sufficient number of adults to supervise the group; (4) trail design will provide adequate cover for wildlife; and (5) observation areas and scopes are provided to view wildlife at a distance which reduces disturbance.

Establishment of environmental education study sites would create some off-trail disturbance of habitat. Again, this disturbance is considered minimal as study sites will be placed in areas already impacted by trail users and Refuge staff, and all off-trail activity will be focused in these small areas. Educators will be instructed on use of the study areas during teacher orientation workshops. Collection of samples for study (i.e., mud, water, plants) will be restricted to study areas, and samples must be used on site. Collection will be of materials needed to enhance hands-on learning and investigation and will be designed as part of structured activities and lessons, guided by teachers, and monitored by Refuge staff. These activities are an integral part of the education program design and philosophy and their impacts are considered minimal.

Education staff will coordinate with Biology staff regarding activities associated with restoration or monitoring projects to ensure that impacts to both wildlife and habitat are minimal. As with any restoration and monitoring activities conducted by Refuge personnel, these activities conducted by students would be at a time and place where the least amount of disturbance would occur.

Anticipated Impacts of Uses within the Proposed Expansion Area: Similar to the management of uses on existing lands, the following conditions must be met before allowing existing uses to occur on an interim basis on newly acquired lands: (1) There is no indirect, direct, or cumulative threat anticipated to human health or safety; (2) There is no indirect, direct, or cumulative threat anticipated to natural or cultural resources; (3) The use is consistent with management of existing Nisqually NWR lands and would contribute to achieving Refuge goals. In particular, existing Refuge regulations would not be compromised; (4) The newly acquired lands represent a meaningful unit within which to manage the activity; and (5) There are no anticipated conflicts with priority public uses.

Future environmental education opportunities in the expansion area associated with habitat restoration and monitoring will have similar impacts as described above.

Public Review and Comment: Public review and comments will be solicited in conjunction with distribution of the draft CCP/EIS for Nisqually NWR. Following the public review and comment period, comments and actions taken to address comments will be summarized here.

Determination:

Use is Not Compatible

Use is Compatible with the Following Stipulations

Stipulations necessary to ensure compatibility: Participants in the Refuge's environmental education program will be restricted to established trails, study sites, and other facilities including buildings, boardwalks, photo blinds, observation decks, and platforms. Existing and

new trails and facilities would be designed, constructed, and operated to provide adequate sanctuary for wildlife populations.

All groups using the Refuge for environmental education will be required to make reservations in advance through the Refuge office. A daily limit of 100 students participating in the education program will be maintained through this reservation system. Efforts will be made to spread out use by large groups while reservations are made, reducing disturbance to wildlife and overcrowding of Refuge facilities during times of peak demand.

Environmental education study sites will be located where minimal impact to Refuge resources will occur. Boardwalks, railings, or platforms will be used as appropriate to minimize disturbance by eliminating repeated foot traffic directly in the habitat. Periodic monitoring and evaluation of sites and programs will be conducted to assess if objectives are being met and the resource is not being degraded.

Trail etiquette and ways to reduce wildlife disturbance will be discussed with teachers during orientation workshops and with students upon arrival during their welcome session. Observation platforms and scopes will be provided to view wildlife at a distance, which will reduce disturbance.

Students participating in restoration and monitoring activities will work as described in the program and as permitted in their reservation form. Students will be trained by Refuge staff before they start restoration and monitoring projects to ensure their safety while out in the field and to minimize wildlife and habitat disturbance. Periodic monitoring and evaluation of activities will be conducted to assess if objectives are being met.

Justification: Environmental education is a priority public use of the National Wildlife Refuge System. Providing a quality environmental education program is a Refuge goal. To achieve this goal, the Refuge environmental education program would provide a diversity of environmental education opportunities to students and teachers. These include: (1) facilities, materials, and training; (2) access to a variety of Refuge habitats; and (3) the ability to observe wildlife and conduct hands-on exploration. The program is intended to foster a better understanding of Refuge ecosystems and wildlife resources, and in turn build a public that is more knowledgeable about and involved in natural resource stewardship. Although there is some impact to Refuge lands and wildlife in having an environmental education program, efforts will be made to ensure that they are minimal. The benefits of an environmental education program to resource management well into the future far outweigh the short-term impacts described above.

Mandatory Re-Evaluation Date (provide month and year for “allowed” uses only):

 X Mandatory 15-year Re-Evaluation Date, will be provided in Final EIS/CCP (for priority public uses)

 Mandatory 10-year Re-Evaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision (check one below):

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Refuge Determination

Prepared by:

(Signature)

(Date)

Refuge Manager/
Project Leader

Approval:

(Signature)

(Date)

Concurrence

Refuge Supervisor:

(Signature)

(Date)

Regional Chief,
National Wildlife
Refuge System:

(Signature)

(Date)

References

USFWS (U.S. Fish and Wildlife Service). 2002. Nisqually National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Impact Statement. U.S. Fish and Wildlife Service, Region 1.

COMPATIBILITY DETERMINATION

(October 2002)

Use: Wildlife Observation, Photography, and Interpretation

Refuge Name: Nisqually National Wildlife Refuge, located in Thurston and Pierce counties, Washington.

Establishing and Acquisition Authority(ies): Nisqually National Wildlife Refuge (NWR) was established on January 22, 1974 with approval by the Migratory Bird Conservation Commission. Approximately 2,925 acres of the approved 3,936 acres have been acquired. Legal authorities used for establishment of the Refuge include: Migratory Bird Conservation Act, as amended (16 U.S.C. 715-715d, 715e, 715f - 715r); and Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a - 742j).

Refuge Purpose(s): Nisqually NWR purposes include:

...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C.-715d).

...for the development, advancement, management, conservation, and protection of fish and wildlife resources ...(16 U.S.C. 742f(a)(4).

... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...16 U.S.C. 742f(b)(1).

National Wildlife Refuge System Mission: “To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (National Wildlife Refuge System Administration Act of 1996, as amended [16 U.S.C. 668dd et seq.]).

Description of Use: Wildlife observation, photography, and interpretation are considered together in this Compatibility Determination because all are considered to be wildlife-dependent, non-consumptive uses and many elements of these programs are similar. Currently, over 95,500 visitors per year participate in these Refuge programs. The Refuge will continue to provide public facilities, including a Visitor Center with interpretive displays, focusing on Refuge habitats and wildlife. Interpretive panels will also be located along Refuge trails. Interpretation would focus on Refuge habitats, estuarine restoration, improved management, and fish and wildlife. All three of these public uses are dependent upon the Refuge trail system. Below is a description of Refuge trails:

1. An existing accessible 1-mile loop boardwalk trail will be maintained. This self-guided trail surrounds permanent and seasonal wetlands and riparian habitat and has 5 wildlife observation overlooks, a viewing platform, interpretive panels, and permanently mounted scopes and binoculars.
2. There would be a 1½-mile trail on a new exterior dike and boardwalk extension that would be linked with the existing Twin Barns Loop Trail, providing a 3½-mile round-trip

- walk. This trail would take visitors out past freshwater wetland and riparian restoration areas into the native estuarine and restoration area with a view of Puget Sound.
3. An unimproved, primitive ½-mile trail would be established in the Nisqually River surge plain forest, providing access farther into one of Washington’s diminishing habitats than the current trail.
 4. A new loop trail (2.5-mile) would be developed on tribal and Refuge lands east of the Nisqually River (Eastside). This trail will lead visitors through pastures, freshwater wetland or riparian restoration areas, and existing and restored estuarine areas. Seasonal closures during the waterfowl hunting season would be required because of activities from a private hunt club. A new visitor contact station and parking area would be constructed to support this trail.
 5. Another new trail would include a trail on the East Bluff in an upland coniferous dominated forest. This trail would be elevated and could provide some viewpoints to overlook the delta. Development of this trail would occur after acquisition of the East Bluff parcel has been completed.

Uses within the Proposed Expansion Area: Chapters 2 and 3 of the Draft CCP/EIS for Nisqually NWR identify areas in which the Service would seek to acquire land from willing sellers outside of the current Refuge boundary (USFWS 2002). Current levels of wildlife-dependent public use are minimal. The Nisqually Reach Nature Center provides the only public access for wildlife observation, interpretation, and photography. However, this facility does not include a trail system. The Refuge would acquire from or develop a cooperative management agreement with WDFW to cooperatively manage the Luhr Beach Boat Ramp and Nisqually Reach Nature Center to improve the interpretation of Refuge resources from this access point. As property is acquired south of I-5 and on the East Bluff, each parcel will be reviewed to determine whether public access trails or viewing areas could be established. Criteria that will be used for determining the development of new trails include the availability of wildlife sanctuary in the immediate area.

Availability of Resources: The following funding/annual costs would be required to administer and manage wildlife observation, photography, and interpretation activities as described above:

	One-Time Cost	Recurring Cost
Maintenance and operation of Visitor Center, including staff, support materials (brochures), and special events		350K
Construct east side visitor facilities	120K	15K
Construct east side trail with interpretive panels	125K	
Maintenance of new Visitor Contact Station(s), parking area (s), and trails		75K
Law enforcement		45K
Signs/Interpretive panels		15K
Administration	_____	<u>30K</u>
TOTAL	\$245K	\$530K

Additional funds would be required to construct, operate, and maintain visitor facilities and interpretive materials. Law enforcement staffing would also be needed. Funding would be sought through the Service budget process. Other sources will be sought through strengthened partnerships, grants, and additional Refuge operations funding to support a safe, quality public use program as described above.

Anticipated Impacts of Use:

Wildlife Observation and Interpretation: The construction and maintenance of trails and boardwalks will impact soils, vegetation, and in some instances hydrology around the trails. This could include an increased potential for erosion, soil compaction (Liddle 1975), reduced seed emergence (Cole and Landres 1995), alteration of vegetative structure and composition, and sediment loading (Cole and Marion 1988).

Human activities on trails can result in direct effects on wildlife through harassment, a form of disturbance that can cause physiological effects, behavioral modifications, or death (Smith and Hunt 1995). Birds can be impacted from human activities on trails when they are disturbed and flushed from feeding, resting, or nesting areas. Flushing, especially repetitive flushing, can strongly impact habitat use patterns of many birds species. Flushing from an area can cause birds to expend more energy, be deterred from using desirable habitat, affect resting or feeding patterns, increase exposure to predation or cause birds to abandon sites with repeated disturbance (Smith and Hunt 1995). For example, flocks of geese and ducks are repeatedly flushed by pedestrians on dike trails leading to McAllister Creek during fall and winter months. Migratory birds are observed to be more sensitive than resident species to disturbance (Klein 1989). Herons and shorebirds were observed to be the most easily disturbed (when compared to gulls, terns and ducks) by human activity and flush to distant areas away from people (Burger 1981). A reduced number of shorebirds were found near people who were walking or jogging, and about 50% of flushed birds flew elsewhere (Burger 1981). In addition, the foraging time of sanderlings decreased and avoidance (e.g., running, flushing) increased as the number of humans within 100 meters increased at a coastal bay refuge on the Atlantic (Burger and Gochfeld 1991). Nest predation for songbirds (Miller et al. 1998), raptors (Glinski 1976), colonial nesting species (Buckley and Buckley 1978), and waterfowl (Boyle and Samson 1985) tends to increase in areas more frequently visited by people. In addition, for many passerine species, primary song occurrence and consistency can be impacted by a single visitor (Gutzwiller et al. 1994). This could potentially limit the number of breeding pairs of certain passerine species, thus limiting production within refuge riparian habitats (Reijnen and Foppen 1994).

Wildlife Photography: Of the wildlife observation techniques, wildlife photographers tend to have the largest disturbance impacts (Klein 1993, Morton 1995, Dobb 1998). While wildlife observers frequently stop to view species, wildlife photographers are more likely to approach wildlife (Klein 1993). Even slow approach by wildlife photographers tends to have behavioral consequences to wildlife species (Klein 1993). Other impacts include the potential for photographers to remain close to wildlife for extended periods of time, in an attempt to habituate the wildlife subject to their presence (Dobb 1998) and the tendency of casual photographers, with low-power lenses, to get much closer to their subjects than other activities would require (Morton 1995), including wandering off trails. This usually results in increased disturbance to wildlife and habitat, including trampling of plants.

Anticipated Impacts of Uses within the Proposed Expansion Area: The following conditions must be met before allowing existing uses to occur on an interim basis on newly acquired lands: (1) There is no indirect, direct, or cumulative threat anticipated to human health or safety; (2) There is no indirect, direct, or cumulative threat anticipated to natural or cultural resources; (3) The use is consistent with management of existing Nisqually NWR lands and would contribute to achieving Refuge goals. In particular, existing Refuge regulations would not be compromised; (4) The newly acquired lands represent a meaningful unit within which to manage the activity; and (5) There are no anticipated conflicts with priority public uses.

Future wildlife observation, interpretation, and photography opportunities in the expansion area will have similar impacts would as described above.

Public Review and Comment: Public review and comments will be solicited in conjunction with distribution of the draft CCP/Environmental Impact Statement for Nisqually NWR. Following the public review and comment period, comments and actions taken to address comments will be summarized here.

Determination:

Use is Not Compatible

Use is Compatible with the Following Stipulations

Stipulations necessary to ensure compatibility: Adequate areas would be designated as wildlife sanctuary with no public use activities to provide high quality habitat for feeding, resting, and thermal protection. Trails will be designed to provide adequate sanctuary areas with minimal fragmentation of habitats. For example, the RNA (764 acres) provides sanctuary because no trails would be developed in this area and seasonal closures and a prohibition on consumptive uses will be enforced. In addition, the restored estuarine area (699 acres) will be closed to all public uses, except for monitoring and research studies. There would be no loop trail in the restored estuarine area because activity in the middle of the restored estuary would be disturbing to wildlife species that use that habitat. In addition, only a short section of boardwalk would remain near McAllister Creek, eliminating much of the current trail activity within this narrow and sensitive area. There would also be no cross trails that would lead visitors into the interior of freshwater habitats to minimize disturbance and maximize bird use in these smaller areas. Where feasible, native trees and shrubs will be planted to create screening along trails to reduce disturbance. These measures will also enhance viewing opportunities and provide quality wildlife observation experiences.

All of the above described uses will be restricted to designated trails and public facilities. Elevated boardwalks with the pin foundation system (no pilings in the ground) will be used in sensitive habitats to reduce effects on soils, vegetation, and hydrology. Observation areas and scopes will be provided to allow visitors to view wildlife at a distance with less or with minimal disturbance. The design of new trails will follow the criteria described above. Any proposed trail developments will only occur after adequate wildlife sanctuary areas have been identified. Visitors will not be allowed into off-trail sanctuary areas unless given permission through the

Refuge's Special Use Permitting system for special circumstances. Refuge staff will enforce Refuge regulations prohibiting unauthorized off-trail activities.

Public use on the Refuge will be restricted to daylight hours only. The capacity of the Refuge will be limited to the 100-car capacity parking lot. When the lot is full, the Refuge trails and facilities will be considered to be full. Regulations and wildlife friendly behavior will be described in brochures and posted at the Visitor Center and Visitor Contact Station(s).

Monitoring protocol would be developed to examine impacts associated with differing levels and types of public use. Monitoring data will be critically analyzed and used by the Refuge Manager to develop future modifications if necessary to ensure compatibility of the wildlife observation, photography, and interpretation programs.

Justification: These wildlife-dependent uses are priority public uses of the National Wildlife Refuge System. Providing opportunities for wildlife observation, photography, and environmental interpretation would contribute toward fulfilling provisions of the National Wildlife Refuge System Administration Act, as amended in 1997, and one of the goals of Nisqually NWR. Wildlife observation, photography, and interpretation would provide an excellent forum for allowing public access and increasing understanding of Refuge resources. The educational possibilities provided by these opportunities would outweigh anticipated impacts associated with implementation of the program. The stipulations outlined above should minimize potential impacts relative to wildlife/human interactions.

Mandatory Re-Evaluation Date (provide month and year for "allowed" uses only):

Mandatory 15-year Re-Evaluation, Date will be provided in Final EIS/CCP (for priority public uses)

Mandatory 10-year Re-Evaluation (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision (check one below):

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Refuge Determination

Prepared by: _____ (Signature) _____ (Date)
Refuge Manager/
Project Leader
Approval: _____ (Signature) _____ (Date)

Concurrence

Refuge Supervisor: _____ (Signature) _____ (Date)
Regional Chief,
National Wildlife
Refuge System: _____ (Signature) _____ (Date)

References

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COMPATIBILITY DETERMINATION

(October 2002)

Use: Research

Refuge Name: Nisqually National Wildlife Refuge, located in Thurston and Pierce counties, Washington.

Establishing and Acquisition Authority(ies): Nisqually National Wildlife Refuge (NWR) was established on January 22, 1974 with approval by the Migratory Bird Conservation Commission. Approximately 2,925 acres of the approved 3,936 acres have been acquired. Legal authorities used for establishment of the Refuge include: Migratory Bird Conservation Act, as amended (16 U.S.C. 715-715d, 715e, 715f - 715r); and Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a - 742j).

Refuge Purpose(s): Nisqually NWR purposes include:

...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C.-715d).

...for the development, advancement, management, conservation, and protection of fish and wildlife resources ...(16 U.S.C. 742f(a)(4).

... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...16 U.S.C. 742f(b)(1).

National Wildlife Refuge System Mission: “To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (National Wildlife Refuge System Administration Act of 1996, as amended [16 U.S.C. 668dd et seq.]).

Description of Use: Nisqually NWR receives 1-4 requests per year to conduct scientific research on the Refuge. Priority would be given to studies that contribute to the enhancement, protection, preservation, and management of native Refuge plant and wildlife populations and their habitats. Research applicants must submit a proposal that would outline: (1) objectives of the study; (2) justification for the study; (3) detailed methodology and schedule; (4) potential impacts on Refuge wildlife or habitat, including disturbance (short and long term), injury, or mortality. This includes a description of measures the researcher will take to reduce disturbance or impacts; (5) personnel required; (6) costs to Refuge, if any; and (7) progress reports and end products (i.e., reports, publications). Research proposals would be reviewed by Refuge staff and others, as appropriate, and Special Use Permits will be issued if approved.

Evaluation criteria will include, but not be limited to, the following:

- 1) Research that will contribute to specific Refuge management issues will be given higher priority over other requests.

- 2) Research that will conflict with other ongoing research, monitoring, or management programs will not be granted.
- 3) Research projects that can be done off-Refuge are less likely to be approved.
- 4) Research which causes undue disturbance or is intrusive will likely not be granted. Level and type of disturbance will be carefully weighed when evaluating a request.
- 5) Research evaluation will determine if any effort has been made to minimize disturbance through study design, including considering adjusting location, timing, scope, number of permittees, study methods, number of study sites, etc.
- 6) If staffing or logistics make it impossible for the Refuge to monitor researcher activity in a sensitive area, this may be reason to deny the request, depending on the specific circumstances.
- 7) The length of the project will be considered and agreed upon before approval. Projects will be reviewed annually.

Uses within the Proposed Expansion Area: Chapters 2 and 3 of the draft CCP/EIS for the Nisqually NWR identify areas in which the Service would seek to acquire land from willing sellers outside of the current Refuge boundary (USFWS 2002). If property is acquired that includes areas of research interest, the same Special Use Permit process and evaluation criteria as described above will be followed.

Availability of Resources: The following funding/annual costs would be required to administer and manage research activities as described above:

	Recurring Costs
Administration (Evaluation of applications, management of permits, and oversight of research projects)	12K _____
TOTAL	\$12K

Refuge operational funds are currently available through the Service budget process to administer this program.

Anticipated Impacts of Use: Some level of disturbance is expected with all research activities since most researchers will be entering areas that are normally closed to the public, including going off designated trails, and may be collecting samples or handling wildlife. However, minimal impact to Refuge wildlife and habitats will be expected with research studies because Special Use Permit conditions will include conditions to ensure that impact to wildlife and habitats are kept to a minimum (see discussion above).

Anticipated Impacts of Uses within the Proposed Expansion Area: The following conditions must be met before allowing existing uses to occur on an interim basis on newly acquired lands: (1) There is no indirect, direct, or cumulative threat anticipated to human health or safety; (2) There is no indirect, direct, or cumulative threat anticipated to natural or cultural resources; (3) The use is consistent with management of existing Nisqually NWR lands and would contribute to achieving Refuge goals. In particular, existing Refuge regulations would not be compromised; (4) The newly acquired lands represent a meaningful unit within which to manage the activity; and (5) There are no anticipated conflicts with priority public uses.

If researchers are granted Special Use Permits to conduct research in the expansion area, anticipated impacts would be similar to that described above.

Public Review and Comment: Public review and comments will be solicited in conjunction with distribution of the Draft CCP/EIS for Nisqually NWR.

Determination:

Use is Not Compatible

Use is Compatible with the Following Stipulations

Stipulations necessary to ensure compatibility: Extremely sensitive wildlife habitat areas will be provided sufficient protection from disturbance by limiting proposed research activities in these areas. All Refuge rules and regulations must be followed unless otherwise excepted by Refuge management.

The criteria for evaluating a research proposal, outlined in the Description of Use section above, will be used when determining whether a proposed study will be approved on the Refuge. If proposed research methods are evaluated and determined to have potential impact on Refuge resources (habitat or wildlife), it must be demonstrated that the research is necessary for Refuge resource conservation management. Measures to minimize potential impacts would need to be developed and included as part of the study design. In addition, these measures will be listed as conditions on the Special Use Permit.

Refuge staff will monitor researcher activities for compliance with conditions on the Special Use Permit. At any time, Refuge staff may accompany the researchers to determine potential impacts. Staff may determine that previously approved research and special use permits be terminated due to observed impacts. The Refuge Manager will also have the ability to cancel a Special Use Permit if the researcher is out of compliance or to ensure wildlife or habitat protection.

Justification: This program as described is determined to be compatible. Potential impacts of research activities on Refuge resources will be minimized because sufficient restrictions would be included as part of the study design and researcher activities will be monitored by Refuge staff. Research projects will contribute to the enhancement, protection, preservation, and management of native Refuge wildlife populations and their habitats.

Mandatory Re-Evaluation Date (provide month and year for “allowed” uses only):

_____ Mandatory 15-year Re-Evaluation (for priority public uses)

X Mandatory 10-year Re-Evaluation, Date will be provided in Final EIS/CCP (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision (check one below):

_____ Categorical Exclusion without Environmental Action Statement

_____ Categorical Exclusion and Environmental Action Statement

_____ Environmental Assessment and Finding of No Significant Impact

X Environmental Impact Statement and Record of Decision

Refuge Determination

Prepared by:

(Signature)

(Date)

Refuge Manager/
Project Leader

Approval:

(Signature)

(Date)

Concurrence

Refuge Supervisor:

(Signature)

(Date)

Regional Chief,
National Wildlife

Refuge System:

(Signature)

(Date)

References

USFWS. 2002. Nisqually National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Impact Statement. U.S. Fish and Wildlife Service, Region 1.

COMPATIBILITY DETERMINATION

(October 2002)

Use: Agriculture - Haying

Refuge Name: Nisqually National Wildlife Refuge, located in Thurston and Pierce counties, Washington.

Establishing and Acquisition Authority(ies): Nisqually National Wildlife Refuge (NWR) was established on January 22, 1974 with approval by the Migratory Bird Conservation Commission. Approximately 2,925 acres of the approved 3,936 acres have been acquired. Legal authorities used for establishment of the Refuge include: Migratory Bird Conservation Act, as amended (16 U.S.C. 715-715d, 715e, 715f - 715r); and Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742a - 742j).

Refuge Purpose(s): Nisqually NWR purposes include:

...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C.-715d).

...for the development, advancement, management, conservation, and protection of fish and wildlife resources ...(16 U.S.C. 742f(a)(4).

... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude ...16 U.S.C. 742f(b)(1).

National Wildlife Refuge System Mission: “To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.” (National Wildlife Refuge System Administration Act of 1996, as amended [16 U.S.C. 668dd et seq.]).

Description of Use: The existing haying program is conducted to provide browse for wintering waterfowl, particularly American wigeon and Canada geese. Approximately 250 acres of Refuge grasslands are hayed annually by a local farmer under a Special Use Permit. Haying operations are not allowed to begin until after July 1 so that most ground nesting birds can finish nesting. No pesticides or herbicides are associated with this use. Fertilizers may be added annually to some hay fields to provide nutrients for better grass production. A Cooperative Land Management Agreement will be developed and the cooperator will be required to provide service or materials to the Refuge that will enhance the habitat in exchange for the hay removed.

As a result of estuarine restoration and freshwater enhancement activities, the haying program will be greatly reduced as the proportion of freshwater wetlands within the diked area increases. By the completion of major restoration activities (2005), less than 100 acres of grasslands will be managed by the Service. These grasslands will be interspersed among permanent and seasonal freshwater wetlands. Once restoration is completed, haying on this reduced acreage may not be cost-effective for a cooperator. If there is a willing cooperator, the haying program will continue

through a Cooperative Land Management Agreement, as described above. However, if no cooperators are interested, the management of the remaining grasslands will become part of routine Refuge habitat management activities.

Uses within the Proposed Expansion Area: Chapters 2 and 3 of the Draft CCP/EIS for the Nisqually NWR identify areas in which the Service would seek to acquire land from willing sellers outside of the current Refuge boundary (USFWS 2002). If property is acquired that include agricultural and grassland areas, each parcel will be reviewed to determine whether a haying program will be established. If established, the program will operate in the same manner as described above.

Availability of Resources: The following funding/annual costs would be required to administer and manage haying activities, as described above:

	Recurring Costs
Administration	<u>5K</u>
TOTAL	\$5K

Refuge operational funds are currently available through the Service budget process to administer this program.

Anticipated Impacts of Use: Anticipated impacts include: (1) short-term disturbance to wildlife caused by presence and activities of equipment and vehicles in fields; (2) detrimental effects of mowing on late ground-nesting birds (after July 1); (3) disturbance to soils or plants associated with mowing and fertilizing; (4) adverse impacts to species associated with dense native grasses, sedges, and rushes; (5) decline in natural biological diversity; and (6) potential introduction of invasive plant species from cooperator equipment. While some conflicts with natural biological diversity principles are evident, management of grasslands benefit wintering waterfowl and would occur in limited areas only. The resulting browse, when flooded in the fall and winter months, created by haying and mowing activities provides important food for wintering waterfowl that is not readily available in other areas during this time. The small acreage of grasslands will be managed as part of a mosaic of permanent and seasonal wetlands, grasslands, and shrub/scrub habitats to provide a diversity of habitats for a variety of migratory birds.

Anticipated Impacts of Uses within the Proposed Expansion Area: The following conditions must be met before allowing existing uses to occur on an interim basis on newly acquired lands: (1) There is no indirect, direct, or cumulative threat anticipated to human health or safety; (2) There is no indirect, direct, or cumulative threat anticipated to natural or cultural resources; (3) The use is consistent with management of existing Nisqually NWR lands and would contribute to achieving Refuge goals. In particular, existing Refuge regulations would not be compromised; (4) The newly acquired lands represent a meaningful unit within which to manage the activity; and (5) There are no anticipated conflicts with priority public uses.

If a haying program is implemented in the expansion area, anticipated impacts would be similar to that described above.

Public Review and Comment: Public Review and comments will be solicited in conjunction with distribution of the draft CCP/Environmental Impact Statement for Nisqually NWR.

Following the public review and comment period, comments and actions taken to address comments will be summarized here.

Determination:

Use is Not Compatible

Use is Compatible with the Following Stipulations

Stipulations necessary to ensure compatibility: A Special Use Permit (SUP) will be issued to all cooperators associated with haying activities. All haying activities will be restricted to designated areas, limiting activity to these annually disturbed sites. Haying activities will start after July 1 each year, so that the majority of the ground-nesting birds have the opportunity to complete nesting, and be completed by November 1 to provide undisturbed winter and spring habitat for migratory waterfowl. Habitat needs in these areas will be reviewed annually to determine whether haying continues to be the appropriate management strategy for each site. Refuge staff will monitor activities of permittee or cooperator to ensure that special conditions required under the SUP or Cooperative Land Management Agreement are met.

Justification: Haying will provide feeding areas for migratory birds, primarily wintering waterfowl, a primary purpose for the establishment of this Refuge. Managing limited grassland areas as designated haying sites with a permittee or cooperator allows the Refuge to achieve specific habitat management objectives for these sites with minimal Service resources. These grasslands would be managed as part of a complex of freshwater wetlands and riparian areas, providing a more diverse mix of habitats for various migratory bird species. In addition, a haying program will complement Refuge reed canary grass control efforts at minimal cost to the Refuge.

Mandatory Re-Evaluation Date (provide month and year for “allowed” uses only):

Mandatory 15-year Re-Evaluation (for priority public uses)

Mandatory 10-year Re-Evaluation, Date will be provided in Final EIS/CCP (for all uses other than priority public uses)

NEPA Compliance for Refuge Use Decision (check one below):

Categorical Exclusion without Environmental Action Statement

Categorical Exclusion and Environmental Action Statement

Environmental Assessment and Finding of No Significant Impact

Environmental Impact Statement and Record of Decision

Refuge Determination

Prepared by:

(Signature)

(Date)

Refuge Manager/
Project Leader
Approval:

(Signature)

(Date)

Concurrence

Refuge Supervisor:

(Signature)

(Date)

Regional Chief,
National Wildlife
Refuge System:

(Signature)

(Date)

References

USFWS (U.S. Fish and Wildlife Service). 2002. Nisqually National Wildlife Refuge Draft Comprehensive Conservation Plan and Environmental Impact Statement. U.S. Fish and Wildlife Service, Region 1.

Appendix H

List of Preparers

Appendix H: List of Preparers

<u>Name</u>	<u>Position</u>	<u>Degree(s)</u>	<u>Years of Exp.</u>
United States Fish and Wildlife Service:			
Mike Marxen	Region 1 - Planning Team Leader	BLA, Landscape Architecture	22
Jean Takekawa	Refuge Manager	BS, Biology	24
Doug Roster	Deputy Refuge Manager	BS, Wildlife Biology	16
Nanette Seto	Refuge Wildlife Biologist	MS, Wildlife Biology BS, Zoology	10
Sheila McCartan	Outdoor Recreation Planner	BS, Environmental Education	15
Curtis Tanner	Estuarine Habitat Restoration	MMA, Marine Affairs BS, Aquatic Science	11
Carrie Cook-Taber	Fish Biologist	MS, Fisheries BS, Fisheries	12
David Bassler	Land Protection Planner	BS, Forest Management	22
Cathy Osugi	Land Protection Planner	BA, Wildlife Conservation	31
Virginia Parks	Region 1 - Archeologist Cultural Resources	MAT, Museum Education BA, Archaeology	12
David Dresher	Region 1 - GIS and Mapping	BS, Geography	15
Bill Hesselbart	Retired Refuge Manager	MS, Wildlife Management BS, Biology	34
Jane Bardolf	Assistant Planner	MS, Natural Resources BS, Environmental Conserv.	16
Ducks Unlimited:			
Ruth Spell	Remote Sensing Analyst	Graduate work, Geography MAT, Education BA, History	11
Anne Van Sweringen	Planning Biologist	BS, Wildlife Biology	20
Steve Liske	Professional Engineer	BS, Civil Engineering	15
Andy Engilis	Senior Regional Biologist	BS, Avian Science	15

Consultants:	Position/Contributions	Degree(s)	Years of Exp.
EDAW, Inc.			
David Blau	Principal-in-Charge/ Advisor	MLA, City Planning BS, Landscape Architecture	27
Kevin Butterbaugh	Project Manager/Principal Planner & Document Coordination;	MLA, Landscape Architecture BS, Agricultural and Resource Economics	13
Colleen McShane	Terrestrial Biologist/ Monitoring Program & Wildlife Section Review	MBA, Project Management MS, Plant Ecology BS, Biology	21
Jennifer Seavey	Effects to Wildlife Resources	MS, Wildlife Sciences BS, Biology	11
Mike Usen	Land Use, Socioeconomics, Environmental Justice	MUP, Urban and Regional Planning BA, Environmental Studies	8
Peter Carr	Editor	BS, Journalism	11
Liza MacKinnon	Word Processor/Graphics	BA, Geography	12
Mary Heim	GIS and Mapping	BS, Landscape Architecture	12
Rob Harris	GIS and Mapping	MLA, University of Washington BA with honors, Near Eastern Languages & Civilizations	3
Consultants: ENSR			
Tarang Khangaonkar	Program Manager/ Hydrodynamic and Sediment Transport Model Development	PhD, Marine Physics & Eng. MS, Ocean Engineering BS, Naval Architecture	15
Steve Breithaupt	Sr. Water Resources Engineer/ Hydrodynamic and Sediment Transport Model Development	PhD, Water Resources Eng. MS, Environmental Science BS, Aquatic Biology	17

Appendix I

Goals, Objectives, and Strategies

Appendix I: Goals, Objectives, and Strategies

Overview

The following goals for Nisqually NWR provide guiding statements for Refuge development and management efforts. Refuge goals apply to all alternatives in the Draft EIS/CCP.

The proposed Nisqually NWR **goals** are broad statements of desired future condition. They represent a step down from the Refuge vision statement, from National Wildlife Refuge System goals, and from broader regional and national programs.

Nisqually NWR Goals:

- I. Conserve, manage, restore, and enhance native habitats and associated plant and wildlife species representative of the Puget Sound lowlands, with a special emphasis on migratory birds and salmonids.
- II. Support recovery and protection efforts for Federal and State threatened and endangered species, species of concern, and their habitats of the Nisqually River delta and watershed.
- III. Provide quality environmental education opportunities focusing on the fish, wildlife, and habitats of the Nisqually River delta and watershed.
- IV. Provide quality wildlife-dependent recreation, interpretation, and outreach opportunities to enhance public appreciation, understanding, and enjoyment of fish, wildlife, habitats, and cultural resources of the Nisqually River delta and watershed.

In contrast, Refuge **objectives** are concise statements of what will be achieved to meet a particular goal. When possible, Refuge objectives should be specific, measurable, achievable, results-oriented, and should be time-fixed within the 15-year life span of the CCP.

Refuge **strategies** describe specific actions, tools, and techniques that can be used to meet objectives. In some cases, strategies describe specific projects in enough detail to assess funding and staffing needs. In other cases, further site-specific detail is required to implement a strategy; this usually takes the form of a step-down management plan, restoration plan, or site plan.

The fully written objective statement and associated strategies are based on the Preferred Alternative D. A table comparing each alternative for each of the main objectives is provided in this document. Specific acreage figures may change depending on the final alternative selected. The proposed objectives and strategies are listed below as they apply to each of the four Refuge goals. Note: Full citations for literature cited in Appendix I are presented in Appendix C (References).

Detailed Description of the Goals, Objectives, and Strategies

The proposed objectives and strategies are listed below as they apply to each of the four Refuge goals.

GOAL I: Conserve, manage, restore, and enhance native habitats and associated plant and wildlife species representative of the Puget Sound lowlands, with a special emphasis on migratory birds and salmonids.

Objective 1.1: Restore Estuarine Habitat

Within 3 years of the CCP's approval, implement restoration of 699 acres of estuarine habitat in the Nisqually River delta estuary and nearshore environments. The desired future conditions include: (1) a mosaic of estuarine habitats, including native salt marsh communities; (2) major reduction of invasive reed canary grass; (3) enhanced use by juvenile salmon; (4) most ponds being connected at low tides to minimize fish entrapment; and (5) increased waterfowl, shorebird, and waterbird use.

Objective Comparison by Alternative				
<i>Objective 1.1: Restore Estuarine Habitat</i>	<u>ALT. A</u> none	<u>ALT. B</u> 318 ac. muted 140 ac. full	<u>ALT. C</u> 515 ac. full restoration	<u>ALT. D</u> 699 ac. full restoration

Rationale: During the last century, over 80% of estuarine wetlands in Puget Sound, and up to 33% of its eelgrass beds, have been lost to dredging, filling, diking, and industrial development (Dean et al. 2000; White 1997; Lane and Taylor 1986). Estuarine marsh habitats (salt marsh) are now rare in the Puget Sound region, comprising only 0.3% of the wetland and deepwater resources found here (Tanner 1999). Estuarine areas provide important feeding and rearing habitat for a variety of fish and wildlife, including the threatened chinook salmon. In the Nisqually delta itself, a loss of 54% of intertidal emergent marsh (salt marsh) habitat occurred through agricultural conversion in the early 1900s. Restoration of intertidal wetlands within the Nisqually River delta could substantially increase the amount of salt marsh in south Puget Sound. Restoring 70% of the currently diked area in the Nisqually NWR to tidal influence would increase estuarine habitat in the south Puget Sound area by 46% (Tanner 1999). Protection and restoration of native estuarine and nearshore habitats is a major ecoregional and recovery goal as identified in the North Pacific Coast Ecoregion Plan (1995), Nisqually Basin Fall Chinook Recovery Plan (2001), and the Northern Pacific Coast Regional Shorebird Management Plan (2000). This objective would benefit estuarine-dependent fish and wildlife species including waterfowl, waterbirds, seabirds, shorebirds, salmon, and invertebrates. Estuarine restoration will also improve the health and function of existing estuarine habitats in the delta. Restoration efforts will focus on habitat-forming processes and functions including tidal influences, sediment delivery, native plant communities, and distributary channel networks.

Strategies:

- Hire a 0.5 full-time equivalent (FTE) Restoration Ecologist, GS-11, to work with partners, including Ducks Unlimited, to develop and implement an estuarine restoration and monitoring plan.
- Develop an estuarine restoration plan by 2004. The plan will include the design for the physical modifications needed to restore 699 acres of estuarine habitats, including removing dikes to grade, filling borrow ditches and excavating breach

sites and historic slough channel depths. Modifications should promote the development of a gradient and mix of estuarine habitat types.

- In coordination with other CCP restoration programs, obtain permits and implement the estuarine restoration plan within 3 years after CCP approval.
- Hire a 0.5 FTE Biological Technician, GS-5/6/7, to monitor and manage invasive/exotic species to increase the native species establishment and support an adaptive management approach. This includes identifying all invasive/exotic species that pose a threat to estuarine habitat and associated control methods.
- Monitor restoration project results to determine the extent of estuarine habitat development. Monitoring should focus on amount, distribution, and processes. Hire a 0.5 FTE GIS/Data Management Specialist, GS-9, to develop and update GIS data associated with monitoring program.
- Develop and implement a monitoring program to document fish and wildlife response in the estuarine restoration area by 2003. Implementation of this program prior to restoration will allow for the collection of baseline data, resulting in a better assessment of restoration efforts and management decisions. Hire a 0.5 FTE Wildlife Biologist, GS-9/11, to focus on this monitoring program.

Objective 1.2: Reduce Human Disturbance

Reduce human disturbance in estuarine habitat of the Nisqually River delta to protect and enhance fish and wildlife dependent on this resource. Provide a minimum of 764 acres in the RNA and other areas within the approved Refuge boundary where wildlife can rest, feed, and nest with minimal human disturbance.

Objective Comparison by Alternative				
<i>Objective 1.2: Reduce Human Disturbance</i>	<u>ALT. A</u> 829 ac RNA with reduced disturbance	<u>ALT. B</u> 829 ac RNA with reduced disturbance	<u>ALT. C</u> 671 ac RNA with reduced disturbance	<u>ALT. D</u> 764 ac RNA with reduced disturbance

Rationale: Refuge estuarine habitat provides crucial feeding and resting areas for a variety of sensitive or declining migratory birds and species of management concern. There are very few areas in Puget Sound that provide long-term, low disturbance areas for fish and wildlife in estuarine habitat. Many areas receive some measure of protection from development, but most allow public access such as boating, PWC use, hunting, or fishing activities. Current public use management is contributing to wildlife disturbance throughout almost all estuarine habitat on the Refuge, providing no sanctuary areas in the estuary. Unauthorized waterfowl hunting is allowed in large portions of Refuge estuary habitat, and required RNA closures to consumptive uses are not enforced. The only remaining substantial eelgrass beds in the Nisqually delta are located in this RNA. Boating occurs year-round with few restrictions throughout Refuge estuarine habitat. There is a need to reduce human disturbance in the estuary, including the RNA and in newly restored estuarine habitat, so natural processes and wildlife response can occur without disturbance from human activities. Implementing use restrictions in the RNA is

also consistent with RNA management policy (Refuge Manual 8 RM 10.8). The Service will conserve these areas for scientific research, wildlife and habitat monitoring, and environmental education.

Low disturbance areas are extremely important for wildlife on Refuges that allow hunting and other public uses because they provide high quality habitat for feeding, breeding, resting, and thermal protection. Without these areas, wildlife species exposed to repeated human disturbances may change food habits and distribution patterns, feed only at night, lose weight, have decreased reproductive success, or abandon the feeding, nesting, and resting areas.

Strategies:

- Manage the existing RNA (764 acres instead of 829 acres) to reduce disturbance to estuarine-dependent wildlife by enforcing prohibitions on consumptive uses and establishing seasonal closures, including posting and signing RNA boundaries. The RNA will be closed to boats from October 1 through March 31.
- Designate the restored estuarine habitats within the Brown Farm Dike (699 acres) and Nisqually Indian Tribal land (300 acres), east of the Nisqually River, as a sanctuary for estuarine-dependent wildlife by prohibiting public boating and consumptive uses and restricting public access to trails along the edge of the site.
- Work with surrounding landowners to assist as volunteer observers to monitor effects of human activities in the Nisqually delta to identify the need for additional wildlife protection measures.
- Implement and enforce 5 mph boat speed limit on all Refuge waters to improve wildlife and habitat protection and reduce disturbance.
- Hire a 0.5 FTE Refuge Officer, GS-7, to conduct all enforcement patrols associated with boating, hunting, fishing, and trail use activities on Refuge lands and waters.
- Monitor wildlife use distribution and abundance to evaluate effectiveness of public use restrictions to allow for adaptive management.
- Post closure signs at Luhr Beach notifying public of closed Refuge property south of Luhr Beach Nature Center.
- Develop cooperative agreement with WDFW to manage Luhr Beach and establish a visitor contact station that includes information on Refuge regulations and ethical viewing advice to reduce wildlife disturbance.

Objective 1.3: Freshwater Wetlands and Grasslands

By 2015, the Service would protect, restore, and enhance a mosaic of 600 acres of freshwater wetlands and grasslands in the Nisqually River delta and lower Nisqually River watershed to serve as foraging and nesting habitat for a variety of migratory and resident bird species, mammals, and native amphibians. A mix of habitats would generally include 5% permanent freshwater, 10-20% grassland, 15-30% riparian, and at least 60% seasonal freshwater habitat.

Objective Comparison by Alternative				
<i>Objective 1.3:</i> <i>Freshwater Wetlands and Grasslands</i>	<u>ALT. A</u>	<u>ALT. B</u>	<u>ALT. C</u>	<u>ALT. D</u>
	1,000 ac in diked area	542 ac in diked area 350-400 ac in expansion	447 ac in diked area 350-400 ac in expansion	263 ac in diked area 350-400 ac in expansion

Rationale: Although the actual amount of acres lost is unknown, estimates of freshwater wetlands lost in Washington range from 20% to as much as 50% during the past two centuries (Lane and Taylor 1996). Roughly 500 to 1,000 acres of freshwater wetlands are filled each year in western Washington (White 1997). Current loss and degradation of freshwater wetlands in western Washington are due to urban expansion, forestry and agricultural practices, industrial development, and invasive or exotic plants and animals (Lane and Taylor 1996). Currently, freshwater wetlands comprise only 18% of wetlands in the Puget Sound area (Tanner 1999) yet they provide habitat for many fish and wildlife species observed in South Puget Sound. Improved management of Refuge lands within the diked area will greatly improve the habitat quality for fish and wildlife.

Much of the lands within the study area located south of I-5 were historically freshwater wetland lowlands. There is excellent potential for wetland restoration on these farmed and drained wetlands. A mixture of permanent and seasonal wetlands and scrub-shrub/grassland habitats would provide a mosaic of freshwater wetlands that can be used by a variety of fish and wildlife (waterfowl, raptors, passerines, and small mammals) throughout the year. Freshwater habitat would also provide diverse wildlife viewing opportunities and interpretive programs for visitors.

Wetland Management Strategies:

- In cooperation with partners, develop and implement a restoration plan with adaptive management strategies to restore and enhance 263 acres within the diked area as approximately 5% permanent freshwater, 10% grassland, 25% riparian, and 60% seasonal freshwater habitat within 5 years after CCP approval. This would include providing seasonally flooded wetlands and grasslands to serve as forage areas for waterfowl during the fall and winter months.
- In cooperation with partners, identify and secure funding for restoration 3-4 years after CCP approval.
- Hire a 0.5 FTE Restoration Ecologist, GS-11, within 1 year after CCP approval to supervise implementation of the restoration and monitoring plan.
- The freshwater area would be subdivided into five units by new internal/external dikes to allow intensive management, thereby improving habitat quality and allowing effective reed canary grass control. Internal dikes would have 5 to 1 slopes while the external dikes, constructed to 12 feet in elevation, would have 3 to 1 slopes.
- Seasonal wetlands would be created and enlarged by excavating and sculpting areas with higher elevations. Seeding and planting would be implemented to stabilize soils and speed recovery of wetland plants. Where appropriate, small permanent ponds would be created.

- New water control structures or pumps would be installed between units to allow water movement through the units, and to provide the ability to drain and flood individual impoundments. Units and ponds would be designed to allow flooding in selected areas to at least 3 feet deep for up to 9 months to improve reed canary grass control.
- Management techniques would include a rotating cycle of draining, mowing, discing, scraping, herbicide application, seeding, and flooding to control reed canary grass, prevent brush invasion, and halt succession in these habitats.
- The water delivery system would be periodically maintained, including the excavation or cleaning of sloughs, ditches, and water control structures, or replacement of water control structures as needed.
- Where appropriate, planting and seeding along the dikes would occur to provide habitat, screening, and erosion control.
- Riparian habitat along the slough would be enhanced with appropriate native plants.

Grassland Management Strategies:

- Grassland species diversity and palatability would be increased for waterfowl by cutting once in July and again in September. Periodic discing, reseeding, and fertilizing would be conducted to reduce weed species and improve forage quality for waterfowl. Grasslands would be managed to support a variety of non-native grasses (pasture mix) used by waterfowl. Native grass species would be encouraged where possible. Soil tests would be conducted to determine appropriate amounts of fertilizer.
- Surveys for ground-nesting bird species would be conducted prior to haying or mowing before July 1.

Other Management Strategies:

- An invasive pest plant species management program for wetland and grassland sites would be developed and implemented.
- Using the priorities established in the Land Protection Plan, work with willing sellers in the study area on land acquisition, focusing efforts on priority areas including protection of properties that would allow long-term wetland restoration of at least 350 -400 acres in the Nisqually Valley lowlands. If acquisition is not possible, conservation easements or cooperative agreements are an alternative to ensure long-term protection and enhancement of these areas.
- As applicable, restoration and management on properties acquired south of I-5 would follow these same strategies.
- Manage future major flood events inside the diked area by designing and implementing water control methods, which could include spillways, pumps, or water control structures.
- Hire a 0.5 FTE Wildlife Biologist, GS-7/9/11, to provide assistance and technical expertise to interested landowners in the study area with programs to enhance habitats and wildlife populations on private land.
- Develop and implement a long-term monitoring and evaluation protocol, including fish and wildlife response, to measure effectiveness of and provide recommendations for current and future management of freshwater wetlands and grasslands. Implementation of this program prior to restoration will allow for the collection of baseline data, resulting in a better assessment of restoration efforts

and management decisions. This will require hiring a 0.5 FTE Wildlife Biologist, GS-7/9/11, and 0.5 FTE GIS/Data Management Specialist, GS-9, to focus on this monitoring program.

Objective 1.4: Riparian Habitat

Provide for the protection, restoration, maintenance, and enhancement of the ecological functions of approximately 1,000 acres of riparian mature mixed forest habitat in the Nisqually River delta and corridor to provide foraging and breeding habitat for migratory and resident landbirds and fish. Desired conditions include habitat connectivity; vegetation diversity in terms of age, native plant species composition, and vegetation layers; vegetation vigor; abundance of snags and woody debris; unimpeded occurrences of natural disturbances; minimization of human disturbances; and an irregular shape and a width adequate to retain riparian habitat functions (Knutsen and Naef 1997)

Objective Comparison by Alternative				
<i>Objective 1.4: Riparian Habitat</i>	<u>ALT. A</u> 250 acres	<u>ALT. B</u> 600 acres	<u>ALT. C</u> 600 acres	<u>ALT. D</u> 1,000 acres

Rationale: Natural riparian forests are diverse, dynamic, and complex habitats supporting a variety of fish and wildlife. Although riparian areas constitute a small portion of the surface landscape, they are highly productive. Approximately 85% of Washington’s wildlife species use riparian habitat associated with rivers and streams (Knutsen and Naef 1997). Habitat for many upland species is also directly enhanced by the presence of adjacent riparian habitat. Riparian areas provide habitat for a variety of bird species, including passerines, woodpeckers, waterfowl, and raptors. As much as 90% of riparian habitat has been lost or modified since the early 1800s (Knutson and Naef 1997). Conditions of several riparian habitats in the study area are degraded (Nisqually EDT Workgroup 1999). Improved protection and enhancement of the Nisqually River corridor would contribute to the conservation of riparian-dependent species and also to salmon recovery. This objective would contribute to ecoregional plan goals, as well as goals of the Conservation Plan for Landbirds in Lowlands and Valleys of Western Oregon and Washington and the Nisqually Basin Fall Chinook Recovery Plan. As a key conservation agency in the Nisqually delta, the Service would play a larger role in protecting and improving riparian habitat on the Fort Lewis Military Reservation and on private lands in the study area upriver from the Refuge.

Strategies:

- Develop a riparian restoration plan to include planting a variety of native riparian trees and shrub species and restoring natural hydrology on 38 acres of currently diked habitat on the Refuge. This may include constructing a bench that would mimic natural sediment deposition bars along the Nisqually River to reduce frequency of tidal inundation and promote sediment deposition.
- Develop and implement a monitoring program to document habitat development and bird response in the restored area. Implementation of this program prior to

restoration would allow for the collection of baseline data, resulting in a better assessment of restoration efforts and management decisions. This would require hiring a 1.0 FTE Fish and Wildlife Biologist, GS-7/9, to conduct monitoring projects.

- Work with Fort Lewis to acquire or manage under a cooperative agreement riparian habitat east of the Nisqually River to protect and restore the native riparian forest. This would require development of a site plan for fishing and vehicle access and hiring a 0.5 FTE Refuge Officer, GS -7 to implement the plan.
- Using the priorities established in the Land Protection Plan, work with willing sellers in the study area on future possibilities of land acquisition, including focusing on a 200-foot protection zone of riparian habitat along both sides of the Nisqually River corridor between I-5 and the Nisqually Indian Reservation boundary. If acquisition is not possible, conservation easements or cooperative agreements would be alternatives to ensure long-term protection of these areas.
- Based on the restoration plan, add large woody debris where appropriate and restore function of large woody debris recruitment in the Nisqually River.
- Develop and implement an invasive species monitoring and integrated pest management control program using both manual and chemical treatment methods. This would require hiring a 0.5 FTE Fish and Wildlife Biologist, GS-7/9, to conduct the monitoring program and guide treatment efforts.
- Some riparian plantings would occur north of the headquarters building and along slough systems in the southern portion of the remaining diked area to widen the corridor of riparian habitat, mimicking native riparian habitat historically found in the delta. Since these areas are not directly connected to a system with natural hydrology, they would not function as native riparian systems.

Objective 1.5: Upland Forest

In 15 years, the Refuge would protect and restore 400-600 acres of native upland forest habitat along McAllister Creek and in the eastern and western bluffs of the Refuge. Protection would occur through restoration of 100 acres of upland forest on existing Refuge lands on the West Bluff and acquisition of priority bluff parcels or through easements or cooperative agreements. Protection and restoration actions would provide habitat for coniferous and deciduous forest dependent species especially tree-nesting species, such as great blue herons and bald eagles, as well as protect water quality, continuous wildlife habitat corridors, and scenic values of the Nisqually delta.

Objective Comparison by Alternative				
<i>Objective 1.5: Upland Forest</i>	<u>ALT. A</u> 100 acres	<u>ALT. B</u> 400-600 acres	<u>ALT. C</u> 400-600 acres	<u>ALT. D</u> 400-600 acres

Rationale: Forested bluff areas in southern Puget Sound are often lost to or compromised by residential development or logging. Urbanization surrounding the Refuge is rapidly occurring. Activities by residents and their pets can disturb nesting birds, and in some cases compromise the stability of the slope, which can lead to erosion and siltation into adjacent Refuge creeks and rivers. Protecting forested habitat would provide a continuous wildlife corridor connecting adjacent habitats with the Refuge. The great blue

heron is a monitored and priority species in the State of Washington because of the increasing loss of foraging and breeding habitats and increasing environmental pollutants associated with human expansion and development. Protection of the West Bluff parcel will not only benefit the great blue heron population nesting along McAllister Creek, but also a pair of bald eagles, a Federally listed threatened species, that also nests in the west bluff area. Maintaining the integrity of the forested bluffs would also be critical in protecting the visual character of the landscape.

Strategies:

- Using the priorities established in the Land Protection Plan, work with willing sellers in the expansion area on land protection, focusing on bluff properties and at least 200 feet along the top of bluff along the eastern boundary of the Refuge and McAllister Creek to protect slope stability, water quality, and foraging and nesting habitats of birds. If acquisition is not possible, conservation easements or cooperative agreements would be alternatives to ensure long-term protection of these areas.
- Work with the Department of Ecology to monitor water quality in McAllister Creek.
- Hire a 0.5 FTE Biological Technician, GS-5/6/7, to assist in monitoring the establishment of invasive species and implementing control measures as necessary.
- Continue to maintain closure to public use on steep bluffs to protect slope integrity and nesting birds (West Bluff parcel).
- Monitor and prevent illegal tree cutting and trespassing on the West Bluff above McAllister Creek.
- Implement an educational program focusing on the importance of forested bluff areas and involve the local community and school groups with restoration efforts.
- Work with landowners and County and City government to manage and control stormwater runoff to maintain slope stability.
- Restore and enhance approximately 100 acres of Douglas-fir dominated mature forest on the West Bluff parcel of the Refuge to reduce fragmentation of forested habitat and provide a habitat and wildlife corridor between Refuge habitats and adjacent lands.

Goal II: Support recovery and protection efforts for Federal and State threatened and endangered species, species of concern, and their habitats of the Nisqually River delta and watershed.

Objective 2.1: Chinook Salmon and Bull Trout

The Service would protect and restore approximately 4,400 acres of estuarine, freshwater, stream, and riparian habitats to protect declining runs of the chinook salmon and bull trout, which are Federally listed as threatened.

Objective Comparison by Alternative				
<i>Objective 2.1: Chinook Salmon and Bull Trout</i>	<u>ALT. A</u> 2,675 acres	<u>ALT. B</u> 3,600 acres	<u>ALT. C</u> 3,700 acres	<u>ALT. D</u> 4,400 acres

Rationale: The chinook salmon was listed as threatened in 1999 and resides in the Nisqually River and estuary. The Nisqually Chinook Recovery Plan has identified restoration of estuarine habitat within the Nisqually River delta as a top priority component to the recovery of this species. The bull trout has historically resided in the Nisqually River system. Any protection to spawning, migration, and rearing habitats would support recovery goals of these two species in the Nisqually River watershed.

Strategies:

- Restore 699 acres of estuarine habitat in the delta.
- Hire a 0.5 FTE Fish and Wildlife Biologist, GS-7/9, to monitor response of fish populations to restoration efforts.
- Implement sections of the Cooperative Agreement with the Nisqually Indian Tribe that supports estuarine restoration of the eastside parcels (east of Nisqually River).
- Protect and restore approximately 1,000 acres along the Nisqually River, McAllister Creek, and their tributaries through acquisition or other land protection measures to protect riverine and riparian habitats essential to the recovery of chinook salmon and bull trout. Where needed, restoration measures would include planting native tree and shrub species, erosion control measures, control of invasive plant species, and reducing physical damage or disturbance to soils and riparian habitats.

Objective 2.2: Species Recovery

The Refuge and Service would work with WDFW to support recovery efforts of the western pond turtle and Oregon spotted frog by protecting and restoring suitable habitats and considering future reintroduction in areas of the Refuge.

Suitable habitat for western pond turtle includes a complex of small ponds near sea level; abundant emergent basking sites; isolation from large bodies of water and streams; emergent vegetation and a mud bottom; abundant invertebrate and larval amphibian as prey; few or no non-native predators like largemouth bass and bullfrogs; and diversity of upland habitats, including open grassy areas for nesting and dense clumps of deciduous trees and shrubs for overwintering.

Suitable habitat for Oregon spotted frog includes emergent wetlands associated with lakes, ponds, and slow-moving streams; shallow emergent wetlands, 5-30 cm deep for breeding; few or no non-native predators like largemouth bass, perch, and bullfrogs; and abundant invertebrates and larval amphibians as prey.

Rationale: Both the Oregon spotted frog and the western pond turtle have highly restricted distributions in western Washington. Spotted frog habitat is scarce, as they now occur in only 10-22% of their historic range in Washington. Only three populations

remain within the State (McAllister 1997). The western pond turtle has been extirpated from most of its range in Washington, with only two populations remaining in the Columbia River Gorge (Hays et al. 1999). Re-establishing self-sustaining populations is vital to the recovery of these species. Like many amphibians, the Oregon spotted frog and western pond turtle need a permanent source of freshwater such as wetlands, ponds, or slow-moving streams.

Strategies:

- Consult with others to identify potential reintroduction sites; if sites are not suitable on Refuge lands, initiate efforts for acquisition within approved acquisition boundaries or pursue other means of protection.
- Identify suitable habitat within the expansion area essential for the protection and conservation of these two species. Assist in developing and implementing improved management practices to enhance habitat and reduce impacts by non-native predators such as the bullfrog.
- Work with WDFW to conduct surveys and promote research and monitoring to better document basic life history information for the two species. Use information for management and recovery of the species.

Objective 2.3: Other Special Status Species

Identify, monitor, and protect all special-status plant and animal species on the Refuge, focusing on species that are State or Federally listed, proposed for listing, or candidates for listing.

Rationale: The Service manages endangered and threatened species as trust species and, wherever possible, strives to assist in the recovery of endangered and threatened species that occur within the Refuge System. A high priority management principle is to benefit species proactively before they become listed to prevent further decline. Federal species lists and recovery plans are found at <http://www.r1.fws.gov/es/endsp.htm>. WDFW maintains a list of special status species through Washington Administrative Codes 232-12-014 and 232-12-011 that can be found through their web site at <http://www.wa.gov/wdfw>.

Strategies:

- Develop and implement a monitoring program with detailed protocols for monitoring the status of special-status species, including methods to assess habitat needs and management actions.
- Protect the active bald eagle nest from human disturbance, using Recovery Plan guidelines (dates and distances).
- Encourage research on special-status species on the Refuge to investigate ecology relevant to improved conservation measures. Research could be conducted by local universities or other organizations with assistance from the Refuge in the form of funding, supplies, volunteers, or technical assistance.
- Identify special-status species locations outside of Refuge lands and prioritize these areas for acquisition, or work with partners to ensure long-term protection.

Goal III: Provide quality environmental education opportunities focusing on the fish, wildlife, and habitats of the Nisqually River delta and watershed.

Objective 3.1: Environmental Education - Program Management

Provide a quality environmental education program at Nisqually with specific learning objectives and diverse opportunities that: (1) meet State standards for learning; (2) are based on Refuge and Nisqually watershed conservation and management programs; (3) support the mission of the Service; and (4) provide stewardship opportunities.

Rationale: With its variety of natural resources, facilities, and proximity to major population centers, Nisqually NWR is in a unique position to offer local education agencies, teachers, and students an opportunity to study natural resource management and conservation issues in an outdoor setting. Since the establishment of the Refuge, educators and youth professionals have been using Nisqually NWR as an outdoor classroom to enhance course curricula. The existing program serves approximately 5,000 students per year. The demand for EE is high and expected to grow.

Environmental education in Washington State is strongly supported by the State Superintendent of Public Instruction (SPI). In 1990, the Washington State School Board directed public schools to incorporate environmental education into all appropriate subject areas. Nisqually NWR is in a position to assist local educators meet the Essential Academic Learning Requirements.

To meet student needs, Refuge staff are committed to looking for ways to teach about wildlife and habitat conservation. The field trip program enhances classroom learning with hands-on outdoor experiences. Summer camps provide students with more in-depth study. As habitat restoration projects are undertaken, students and teachers will be included in hands-on restoration and monitoring activities. These types of activities require management support and commitment of personnel and funds.

Strategies:

- Hire a permanent-full time environmental education specialist (GS-09) on the Refuge staff to manage the environmental education program, within 2 years after CCP approval.
- Provide for additional program assistance through trained volunteers, interns from local colleges, AmeriCorps, or the Student Conservation Association.
- Hire a second full-time environmental education staff person (GS-09) within 4 years after CCP approval, to serve 15,000 students per year. This staffing would be comparable to other environmental education programs of that size.
- Provide opportunities during the summer for students to participate in an extended, more in-depth study of the natural environment.
- As changes are made to habitats on the Refuge, opportunities would be created to include teachers and students in these long-term restoration activities. These could be one-time activities such as planting, or long-term involvement including planning, design, and actual on the ground implementation for a restoration site.
- As changes are made to the habitats on the Refuge, specifically tidal restoration, monitoring activities for students would be developed. Plots could be identified

and teachers recruited who would work over the course of the school year to carry out monitoring activities with their students on vegetation, wildlife, and water quality.

- Support the water quality testing projects conducted by the Nisqually River education project and project GREEN.
- Develop a butterfly/native garden in the area of the Education Center.
- Conduct regular evaluations with feedback from teachers and students to improve and modify program as needed.

Objective 3.2: Environmental Education - Students Served

Provide adequate information, site-specific materials, curricula, and facilities to accommodate a year-round field trip program that serves up to 100 students per day, 5 days a week, 15,000 students per year.

Objective Comparison by Alternative				
<i>Objective 3.2: Environmental Education - Students Served</i>	<u>ALT. A</u> 5,000 per yr	<u>ALT. B</u> 20,000 per yr	<u>ALT. C</u> 15,000 per yr	<u>ALT. D</u> 15,000 per yr

Rationale: Nisqually NWR serves 5,000 students and teachers annually and in 1998, reached approximately 8,000 students and teachers on and off-site. It is estimated that the Refuge could accommodate up to 15,000 on site each year if: (1) an education staff of up to 3 people ran the program full-time; and (2) educators were trained and could be recruited to utilize the Refuge during all months of the school year, not just in May and June. With more opportunities and a more structured program where teachers are trained to use the site and are provided with site-specific materials and tools, educators should be eager to use the Refuge year-round. A triple-wide trailer currently serves as the temporary indoor facility for the education program. A new 4,000 square foot EE facility, which would be located near the Visitor Center, is envisioned as the central focus of the EE program with 7 outdoor study sites located on the Refuge.

Strategies:

- The Refuge will have readily available information about the environmental education program, will respond to all inquiries in a timely manner, and will provide information to local schools.
- Groups using the Refuge for environmental education purposes would be limited to 100 students per day and would be required to make reservations in advance through the Refuge Office. Reservations would be taken on a first come-first served basis.
- Group leaders must attend a workshop or orientation session before bringing their classes to the Refuge.
- Groups using the Refuge for environmental education purposes would be limited to the trails and designated environmental education study sites, except by special use permit.

- Seven environmental education study sites would be designated in the area of the Twin Barns Loop Trail where students can participate in more in-depth study by 2003.
- Develop and provide site-specific materials and tools for educators' use, both on and off site. These materials would include an educator's guide "Where the River Becomes a Delta," which would serve as a site-specific field trip guide and a companion guide to the others that have been developed for the Nisqually River Watershed—"The Living River," "Where the River Begins," and "Where the River Meets the Sound."
- Provide Discovery Packs for use by small groups and non-formal education groups.
- A triple-wide trailer will be used as the temporary indoor classroom facility until a new facility is built and would be available for environmental education groups on a reservation basis. Once constructed, the new 4,000 square foot facility will have small group learning areas, a large group presentation room, bathrooms, a small kitchen, office space, parking, lunch area, and a lab to conduct activities such as water quality testing.

Objective 3.3: Environmental Education - Field Trip Program

Provide a Refuge field trip program where trained educators, volunteer adult leaders, and youth professionals lead their own students in active, hands-on field investigations focusing on the conservation of our natural resources.

Rationale: Using the "multiplier effect," educators and youth professionals will conduct their own field trips to the Refuge. This allows for the maximum number of students participating in the program with less commitment of staff time. The multiplier effect occurs when the Refuge education staff trains educators who can then use their knowledge and skills year after year with students. Other adults involved in the program also gain new knowledge and awareness and tell their friends and community leaders who influence public policy. Staff are then available to train more educators and work on program growth and development.

Strategies:

- Refuge education staff and volunteers will provide guidance to educators interested in teaching about natural resource issues by assisting in lesson and field trip planning on the phone or in person.
- The Refuge will provide educator workshops and courses sponsored by the Refuge or by Refuge partners on topics related to natural resources and the environment such as Project WET.
- Refuge education staff and volunteers will provide regularly scheduled field trip orientation workshops for educators and youth professionals.

Objective 3.4: Environmental Education Partners and Networking

Refuge staff will work with other agencies and organizations to provide assistance to other programs by designing, conducting, or hosting at least one regionally based environmental education field trip, workshop, seminar, or study course each year.

Rationale: Many opportunities exist for the Service to work together with partners to both enhance the program at the Refuge but also to provide coordination and assistance to

other local programs. Refuge staff would be available and would seek out ways to collaborate in environmental education efforts throughout south Puget Sound, both on and off the Refuge.

The education staff at Nisqually NWR are also in a position to network and provide assistance to other agencies and individuals working in environmental education throughout the region. As a Federal agency with a high profile program, Refuge staff have an opportunity and responsibility to participate on a regional level in coordinating and furthering environmental education efforts.

Strategies:

- Work with partners to strengthen education programs in the Nisqually River watershed including the Nisqually River Council Education Committee, the Nisqually Reach Nature Center, and the Nisqually Indian Tribe.
- Work with partners outside the Nisqually River Watershed including Project GREEN and Sound Stewards.
- Refuge education staff would participate in regional environmental education efforts to coordinate environmental education activities, programs, and curricula with educators throughout the region.
- Nisqually NWR would serve, upon request of the Regional Office, as the Washington State Coordinating office for the Federal Junior Duck Stamp Design Contest.
- Refuge staff, materials, and facilities would be made available to other groups wishing to gather ideas for their programs and would serve as a model for other local, State, and Federal environmental education programs.

Goal IV. Provide quality wildlife-dependent recreation, interpretation, and outreach opportunities to enhance public appreciation, understanding, and enjoyment of fish, wildlife, habitats, and cultural resources of the Nisqually River delta and watershed.

Objective 4.1: Waterfowl Hunting

The Refuge would open 191 acres to waterfowl hunting 7 days per week within 1-2 years after CCP approval. Refuge lands would combine with WDFW lands to create more manageable and enforceable hunt boundaries that would reduce conflicts with other users, reduce confusion for hunters, provide sufficient sanctuary, create uncrowded conditions, and ensure a reasonable harvest. The Refuge would also explore new opportunities for “walk-in” waterfowl hunting as property is acquired south of I-5.

Objective Comparison by Alternative				
<i>Objective 4.1: Waterfowl Hunting</i>	<u>ALT. A</u> Closed, but unauthorized hunting occurs	<u>ALT. B</u> Closed	ALT. C 713 acres (1,170 total acres with State lands)	ALT. D 191 acres (808 total acres with State lands)

Rationale: Hunting is a traditional activity in the Nisqually delta and one of the priority public uses of the Refuge System. Waterfowl hunting is open to the public on WDFW lands (617 acres) with around 1,100 visits estimated per year. A private hunt club operates on tribal lands east of the Nisqually River (approximately 325 acres) as part of life tenant uses by the previous landowner. Regulations such as hunting days, maximum number of hunters, etc. are different on these lands. Currently, much of the Refuge tidelands and salt marsh is administratively uncontrollable because of the irregular boundaries of the three WDFW parcels located within Refuge boundaries and the inability to keep these boundaries posted. As a result, unauthorized hunting occurs on large portions of Refuge lands, including the RNA. This unauthorized hunting occurs in spite of the fact that the Refuge has never been officially opened to hunting. This existing condition provides insufficient wildlife sanctuary and allows an unauthorized use to continue on large parts of the Refuge.

By opening a limited portion of Refuge lands (191 acres) to waterfowl hunting, a more manageable block of lands could be posted and enforced, and waterfowl hunting in the Nisqually delta would continue to be provided along with increased sanctuary. The RNA would be reduced by 73 acres to provide additional high quality hunting lands at the mouth of the Nisqually River. State lands would continue to be open to waterfowl hunting with no changes. Each agency would be responsible for managing its respective hunt program.

Refuge hunt programs are designed to provide high quality experiences. A quality hunting experience means that: (1) hunters are safe; (2) hunters exhibit high standards of ethical behavior; (3) hunters are provided with uncrowded conditions; (4) hunters have reasonable harvest opportunities; (5) hunters are clear on which areas are open and closed to hunting; and (6) minimal conflicts occur between hunters and other visitors, such as kayakers, anglers, and trail users. In general, hunting on Refuges should be superior to that available on other private or public lands, which may require special restrictions (Refuge Manual 8.RM5.14). Measures are often used to ensure quality, including limited hunt days and shell limits and using buffers for public use trails eliminating the need for seasonal trail closures. A limited waterfowl hunt program is proposed on the Refuge to accomplish the following:

- ▶ accommodate the existing hunt program on WDFW lands;
- ▶ establish consistent regulations across all lands
- ▶ provide a quality hunting experience that meets Refuge guidelines and policies
- ▶ provide sufficient sanctuary and resolve the current unauthorized hunting situation

Strategies:

- Write a hunting plan to be consistent with the CCP (hunting location, 7-day/week hunt, 25-shell limit, and 200-yard buffer from trails) and complete process to open Refuge to hunting within 1-2 years after CCP approval.
- Reach agreement with the State to implement a 25-shell limit on WDFW lands.

- Provide sufficient feeding and resting habitat for waterfowl in areas closed to hunting as a sanctuary.
- Post and sign a manageable hunting area including redefining and reducing the RNA by 73 acres.

- Develop a hunting brochure which includes information on hunter ethics, safety precautions, and restrictions.
- Hire a 0.5 FTE Refuge Officer (GS-07) to enforce hunting program regulations; to ensure quality and safety; and to protect natural resources.
- Hire a 0.5 FTE Biological Technician (5/6/7) to conduct hunter bag checks to monitor harvest and compliance with State waterfowl hunting program regulations.
- Manage Luhr Beach boat landing area through cooperative agreement with WDFW and upgrade facilities to use as a hunter contact station.
- Lands acquired through Refuge expansion, south of I-5, would be evaluated for hunting opportunities as they come under Refuge jurisdiction.
- Periodically monitor and evaluate hunting program with feedback from users to determine if objectives are being met.

Objective 4.2: Fishing and Shellfishing

The Refuge would provide a variety of quality boat and bank fishing experiences in selected areas which are safe, consistent with State regulations, and compatible with Refuge resources and purposes. The Refuge fishing and shellfishing program will promote responsible and ethical behavior and a deeper appreciation and understanding of fishery resources of the Nisqually delta.

Objective Comparison by Alternative				
<i>Objective 4.2: Fishing and Shellfishing</i>	ALT. A	ALT. B	ALT. C	ALT. D
	1 Existing Site	1 Existing Site 2 Expansion Sites	1 Existing Site 1 New Site 2 Expansion Sites (1 accessible)	No Existing Site 1 New Site 2 Expansion Sites (2 accessible)

Rationale: The Nisqually delta supports a diverse fishery resource including shellfish, bottomfish, anadromous fish, and other freshwater species. Declines in populations of many species and area restrictions require an informed and responsible angler. Fishing is a priority activity of the Refuge System and a traditional form of recreation in the delta. Compatible opportunities can be provided with reasonable restrictions, good compliance with regulations, and if administrative oversight required is minimal. One bank fishing site would be maintained and developed on the existing Refuge, with potential for a second site designated as a disabled visitor access only. Additional bankfishing and water access sites would be considered on lands south of I-5 as they are added to the Refuge. Location criteria for new sites considered will be accessibility, feasibility, minimal conflicts with other users, maintenance, compatibility, and potential to promote a quality fishing experience. The Trotter’s Woods fishing site would be designated and managed for fishing if acquired from Fort Lewis or managed under cooperative agreement.

In 2000, recreational shellfish beds were closed in the Nisqually tideflats due to high coliform levels and health concerns. The Service can educate visitors about these closures. If water quality improves, these beds could be opened in the future.

A quality fishing or shellfishing experience means that: (1) anglers/shellfishers are safe; (2) anglers/shellfishers exhibit high standards of ethical behavior; (3) anglers/shellfishers are provided with uncrowded conditions; (4) anglers/shellfishers are clear on which areas are open and closed to fishing; and (5) minimal conflicts occur between anglers/shellfishers and other visitors, such as hikers, hunters, and kayakers.

Strategies:

- Within 3 years after CCP approval, update the fishing management plan to be consistent with the CCP and State regulations.
- As additional lands are acquired, work with partners to select and locate fishing access sites to provide a range of fishing opportunities in riverine and tidal locations including Trotter's Woods in Fort Lewis on the Nisqually River south of I-5.
- As part of the update of the fishing management plan determine if an accessible bank fishing site could be located at the boardwalk river overlook on the Twin Barnes Loop Trail.
- Work with Nisqually Indian Tribe to provide parking, trail, and a bank fishing site on the east side of the Nisqually River.
- Provide accessible fishing site at Luhr Beach, if feasible, following development of a cooperative management agreement with WDFW.
- Provide safe fishing conditions by maintaining trails, signs, and information to alert anglers regulations and to hazards.
- Periodically monitor and evaluate fishing program and users to determine if objectives are being met.
- Provide specific information for shellfishing at the Luhr Beach access, including closure information in cooperation with other agencies.
- Restrict boaters from landing and bank fishing in closed areas through policy and regulation.
- Enforce boat speed limits in Refuge waters.
- Hire a 0.5 FTE Refuge Officer (GS-7) to conduct all enforcement patrols associated with boating, hunting, fishing, and trail use activities on Refuge lands and waters.
- Take steps to close the RNA to fishing and shellfishing, including posting, providing information on regulations at Luhr Beach and other appropriate locations, outreach, and conduct monitoring of results.

Objective 4.3: Wildlife Observation

Provide safe, attractive, and accessible wildlife viewing opportunities in all primary habitat types represented on the Refuge including estuarine, freshwater wetland, grassland, riparian forest, riverine, and upland forest.

<i>Objective 4.3: Wildlife Observation</i>	Objective Comparison by Alternative
ALT. A	1-mi boardwalk loop trail; 5.5-mi loop trail; 0.5-mi primitive trail
ALT. B	1-mi boardwalk loop trail; 5.5-mi loop trail; 0.5-mi primitive trail
ALT. C	1-mi boardwalk loop trail; 3.75-mi loop and boardwalk trail; 0.5-mi primitive trail; 2.5-mi east side loop trail; East Bluff trail
ALT. D	1-mi boardwalk loop trail; 3.5-mi round trip trail including boardwalk (no loop); 0.5-mi primitive trail; 2.5-mi east side loop trail; East Bluff trail

Rationale: As a priority public use, wildlife observation programs receive priority consideration in Refuge planning and management, secondary to the needs of fish and wildlife. Wildlife viewing and nature observation are the primary visitor activities at Nisqually NWR. The Refuge is considered by many to be one of the best birding areas in Puget Sound. High quality wildlife viewing will continue to be provided on the Refuge through the development and maintenance of trails, boardwalks, and observation sites (i.e., elevated viewing platforms). Wildlife viewing opportunities will be provided for nearly 100,000 visitors who come to Nisqually NWR each year. Estuarine restoration would result in the loss of large portions of the existing 5.5-mile dike loop trail and would require new trails and modifications to existing trails to provide quality wildlife viewing opportunities, access to a variety of habitat types, and to accommodate high visitor demand, while minimizing wildlife disturbance and providing sufficient wildlife sanctuary.

Quality wildlife observation is defined by several elements including: (1) opportunities exist to view wildlife in their habitat and in a natural setting; (2) observation opportunities promote public understanding of Nisqually NWR resources and its role in managing and protecting those resources; (3) observations occur in places with the least amount of disturbance to wildlife; (4) facilities are safe, fully accessible, and available to a broad spectrum of the public; (5) viewing opportunities are tied to interpretive and educational opportunities; and (6) observers have minimal conflict with other visitors or Refuge operations.

Strategies:

- Within 3 years following approval of the CCP, develop a visitor services plan that covers all Refuge public use programs.
- As part of the estuarine restoration project, provide an accessible 1-mile loop trail and additional trail length with boardwalk extensions. Pursue funding for a 0.75-mile one-way boardwalk spur along McAllister Creek which would provide a 3.5-mile round-trip trail, portions of which would be closed during waterfowl hunting season.

- If interests in Luhr Beach site are developed through cooperative management agreement, maintain and enhance current parking and viewing facilities. Evaluate fee collection at this site. Provide adequate parking, restrooms, signs, and gate. An information kiosk (Visitor Contact Station) will provide public use regulations to visitors to increase safety and reduce the frequency of visitors entering closed areas on the Refuge.
- Establish a 0.5-mile unimproved trail in the surge plain forest. This trail would not be fully accessible.
- In cooperation with the Nisqually Indian Tribe, design, construct, and manage a seasonal loop trail on tribal and Refuge lands east of the Nisqually River. Seasonal closures of this trail would be required during waterfowl hunting season until private hunt club ceases.
- If East Bluff property is acquired or protected, pursue the development of a new East Bluff upland forest trail connecting to the City of DuPont/Northwest Landing trail system.
- Maintain habitats to ensure abundance of wildlife for optimum viewing.
- Promote wildlife viewing and interpretation by incorporating Refuge information into Amtrak passenger train service.
- Hire an outdoor recreation planner, GS-9, (0.5 FTE).

Objective 4.4: Wildlife Interpretation

Refuge staff will continue to provide a variety of quality interpretation programs, facilities, and services to Refuge visitors. In addition, each year Refuge staff will identify and serve one new or non-traditional audience to communicate important messages about fish and wildlife conservation and provide opportunities for people to connect with nature at Nisqually Refuge.

Rationale: The Refuge is situated in an ever-growing urban area with decreasing open space and places for people to connect with the natural world. Nisqually NWR, with its visitor facilities and access to wildlife habitat, is a uniquely situated natural area in this region because of its proximity to a major freeway and large urban population.

More than 100,000 people visited the Refuge in 2000. The Refuge provides a variety of programming and services to these visitors, from a state-of-the-art Visitor Center with interpretive exhibits to special events communicating important messages about fish and wildlife conservation and connecting people with nature. But the potential is much greater. Continued growth of the area will mean an increasing need to provide people with information about the Refuge, fish and wildlife conservation, and stewardship of our natural resources. Access to wildlife habitats would continue to be a primary focus for interpretation programs and facilities. Interpretive programs will include interpretation on habitat restoration designed to help visitors understand the importance of this program and its benefits to wildlife. New and non-traditional audiences must be reached. Refuge staff will look for ways, through partnerships, special events, and off-site programs, to reach new audiences with wildlife conservation messages.

Strategies:

- Within 3 years following approval of the CCP, develop a visitor services plan that covers all Refuge public use programs.
- Hire an outdoor recreation planner, GS-9 (0.5 FTE).

- Provide interpretation on Refuge trails through the use of interpretive panels and self-guided trail brochures.
- Maintain visitor center exhibits that interpret broad issues such as the watershed, flyway, and estuary. Replace exhibits as needed to keep them current and well maintained.
- Maintain a rotating wildlife art exhibit in the Visitor Center auditorium.
- Support efforts of the Nisqually Refuge Cooperating Association in providing quality educational and interpretive programs, materials, and sales items.
- Work together with partners to produce quality special events at the Refuge such as Summer Lecture Series, Nisqually Watershed Festival, International Migratory Bird Day, and National Wildlife Refuge Week, which communicate fish, wildlife, and habitat conservation messages. Special events will identify one new or non-traditional audience to include in publicity efforts.
- Provide weekend volunteer naturalist led interpretive programs led by on topics such as history of Brown Farm, spring wildflowers, and bird migration.

Objective 4.5: Wildlife Photography

Provide a variety of quality wildlife photography opportunities to increase visitor understanding and appreciation for and enjoyment of Nisqually River delta resources.

Rationale: Wildlife photography is one of six priority wildlife-dependent recreational uses of the National Wildlife Refuge System. Photographic opportunities promote public understanding and increase public appreciation for America’s natural resources and incorporate a message of stewardship and conservation. The Refuge will provide a high quality photography program where compatible with sound principles of fish and wildlife management, other objectives, and other compatible uses.

Strategies:

- Following habitat restoration activities and as part of a visitor services plan, determine the need for and locations of permanent photo blinds. New photo blinds would be constructed and placed in areas that would have the least amount of disturbance to wildlife.
- Evaluate current use and needs of photographers on the Refuge.
- In trail development, include spur trails or widened trail or boardwalk push outs to allow photographers space for equipment.
- Provide a wildlife photography interpretive program.
- Have wildlife photo exhibits as part of rotating wildlife art exhibit in Visitor Center.
- Include information on photography and ethical behaviors in Refuge brochure.
- Conduct regular evaluations, including feedback from photographers, to determine whether objective is being met.

Objective 4.6: Outreach and Partnerships

The Refuge will take a leadership role in developing and strengthening partnerships, including a volunteer services program, and will conduct a variety of outreach efforts to more effectively achieve Refuge goals and contribution to the protection and enhancement of the Nisqually River watershed.

Objective Comparison by Alternative				
<i>Objective 4.6 Outreach and Partnerships</i>	<i>ALT. A</i> 70 volunteers	<i>ALT. B</i> 100 volunteers	<i>ALT. C</i> 100 volunteers	<i>ALT. D</i> 100 volunteers

Rationale: Strong partnerships will be essential for the Service to achieve its vision and goals for the Refuge. Cooperative efforts with key partners will greatly further habitat protection and restoration, watershed efforts, and education and interpretation. The Refuge’s location in the Nisqually delta provides a focal point that encourages participation by a variety of partners to come together to strengthen watershed protection. The volunteer services program is a critical part of the Refuge workforce, benefitting all programs and goals, and strengthening community relations. Volunteers contribute the equivalent of 3.7 FTEs annually, donated by more than 70 volunteers. Outreach efforts will enable the Refuge to reach new audiences.

Strategies:

- Within 2 years of CCP approval, hire a GS-7/9 volunteer coordinator to strengthen and enlarge the volunteer services program to provide effective training and program management of the program for a corps of 100 volunteers. Continue to involve volunteers in a variety of Refuge programs to strengthen ties with the community.
- Conduct special events to reach out to new audiences and involve partners, for example the Nisqually Watershed Festival, International Migratory Bird Day, and Summer Lecture Series.
- Work to provide funding and other support to partners to strengthen the outreach and education program through challenge grants and other grant programs.
- Participate in off-site community events to further Refuge goals.
- Continue active participation in critical partnership efforts such as the Nisqually River Council and the Audubon Refuge Keepers.
- Strengthen coordination with the Nisqually Refuge Cooperating Association through regular meetings, assisting in providing training, and coordination with the volunteer program.

Objective 4.7: Cultural Resource Program

Implement a proactive cultural resource management program that focuses on meeting the requirements of the National Historic Preservation Act, including consultation, identification, inventory, evaluation, and protection of cultural resources.

Rationale: The management and protection of cultural resources is an integral element in fulfilling Refuge goals. The Refuge supports a variety of cultural resources and has opportunities to provide interpretation and education to diverse audiences on these unique aspects of the Nisqually delta area. Refuge expansion and changes to Refuge habitats and facilities warrant a comprehensive cultural resource management program.

Strategies:

- Develop an interpretive program that presents accurate information about Native American history of the Nisqually delta and lower watershed.
- Protect and record the values of the Refuge's historical landscape and archaeological resources while managing habitat and wildlife.
- Identify archaeological sites that coincide with existing and planned roads, facilities, public use areas, and habitat projects. Evaluate threatened and impacted sites for eligibility to the National Register of Historic Places. Prepare and implement activities to mitigate impacts to sites as necessary.
- Develop a GIS layer for cultural resources that can be used with other GIS layers for the Refuge, yet contains appropriate locks to protect sensitive information.
- Develop partnership with the Nisqually Indian Tribe for cultural resources inventory, evaluation, and project monitoring, consistent with the regulations of the National Historic Preservation Act.

Objective 4.8: Cultural Resources Education and Interpretation

Develop, in partnership with the Nisqually Indian Tribe and other preservation partners, a program for the education and interpretation of cultural resources of the Nisqually NWR.

Rationale: Cultural resources are not renewable. Thus, interpretation of cultural resources can instill a conservation ethic among the public and others who encounter or manage them. The goals of the cultural resource education and interpretive program are fourfold: (1) translate the results of cultural research into media that can be understood and appreciated by a variety of publics, (2) engender an appreciation for the Native American culture and perspective on cultural resources, (3) relate the connection between cultural resources and natural resources and the role of humans in the environment, and (4) instill an ethic for the conservation of our cultural heritage.

Strategies:

- Prepare interpretive media (e.g., pamphlets, signs, exhibits) that relate the cultural resources and Native American perspective and Euro-American settlement history of the Refuge for visitors.
- Prepare environmental/cultural education materials for use in education center schools concerning cultural resources, the perspective of Native Americans, the history of the area, and conservation of natural and cultural resources.
- Develop partnerships with educational institutions for the interpretation and protection of cultural resources at the Refuge.
- Consult with the Nisqually Indian Tribe to identify the type of cultural resources information appropriate for public interpretation.
- Develop an outreach program and materials so that the cultural resource messages become part of cultural events in the area, including: Washington Archaeology Month, National Wildlife Refuge Week, and appropriate local festivals.

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Appendix J

Hydrodynamic and Sediment Transport Modeling Summary

Appendix J: Hydrodynamic and Sediment Transport Modeling Summary

Introduction

A hydrodynamic and sediment transport model and technical report were developed to evaluate tidal restoration alternatives at Nisqually NWR (ENSR 1999). This computer model was used to simulate water, sediment, and salinity characteristics under various restoration scenarios using a mean tide and mean annual river flow condition, and under 1996 river flood conditions. This modeling effort was useful in evaluating critical physical components involved in restoration, including water flow, timing, velocity, bed shear, salinity, sedimentation, and extent of tidal inundation. The model was also used to assess extreme flood conditions and alternative dike configurations.

Methods

The study area included the Nisqually River, McAllister Creek, I-5, and Puget Sound/Nisqually Reach as limits on each side. Existing data were used as much as possible on river and delta geometry, bathymetry, currents, salinity, and sediment characteristics. In addition, new data were gathered in the Nisqually River and McAllister Creek to fill information gaps, including river bathymetry, velocity time-series, salinity profiles, water surface elevations, suspended sediment concentration, and creek and pond bathymetry inside the diked area. The models used were RMA-10 for hydrodynamics and RMA-11 for sediment and salinity transport. These models can account for the effects of temperature, salinity, and suspended sediment on flow in rivers, estuaries, lakes, and reservoirs. The models were calibrated and verified using data collected during spring 1998 from the Nisqually River and McAllister Creek.

Eight alternatives were examined (with a variation in breach width on one alternative), ranging from Alternative 1, no changes in existing dike configuration (status quo), to Alternative 8, with maximum tidal restoration (approximately 80% of the diked area). Each alternative assumed the dikes were reduced down to grade in estuarine restoration areas, and the adjacent borrow ditch was filled, except for two alternatives that included breaching and bridging dikes in specific locations and retaining the dike system, with the borrow ditch left unfilled. Breaches in Alternative 3 had widths of 45 to 55 feet, creating restricted tidal flow. Breach widths were also modified in Alternatives 3 and 4 with breach widths sized to be slightly wider than the size of the existing tidal sloughs, so as to try ensure that high tidal volumes could enter and exit the restoration site. This made breaches very wide, from approximately 240 to 325 feet. These modifications were referred to as Alternatives 3W and 4b. Alternative 6, the 70% tidal restoration alternative, included a low berm to create a riparian restoration zone along the Nisqually River. All alternatives were designed to protect Nisqually NWR headquarters facilities within dikes.

Modeling Results and Discussion

The model provides important information that is useful in assessing some of the key components of estuarine restoration projects. Successful estuarine restoration typically depends on recreating a fully functional tidal system, where the tidal prism or volume is sufficient for full tidal inundation in the restored area with each tidal cycle. Natural patterns in tidal flushing and

circulation are critical to flush soils, carry nutrients and sediments to all parts of a restored site, and create the intricate system of tidal channels that feed a salt marsh. Conversely, tidal waters must be able to evacuate the site, to avoid ponding and fish entrapment. Excessive ponding will create lagoon-like or subtidal conditions, rather than a salt marsh. Isolated ponding can create artificially high salinities in water or soils due to evaporation and lack of flushing. Successful estuarine restoration also depends on the ability of sediments to reach the restored site, to accumulate soils and build the elevations necessary to grow salt marsh vegetation. Areas requiring tidal restoration are often subsided, and sedimentation is a critical component of successful restoration. Another important factor in successful estuarine restoration includes minimizing areas of high water velocity or bed shear to avoid creating highly erosive features. High bed shear could result in erosion of salt marsh, dikes, or breaches that would present potential failure sites or constant maintenance needs.

Dike Configuration and Water Movement: In alternatives where the dikes were removed to grade and the borrow ditch filled, full tidal penetration occurred with each of the alternatives. In Alternative 3, when dikes were breached with narrow openings along McAllister Creek, the peak water surface elevation in the restored area decreased by approximately 1.7 feet, and the peak was delayed by 40 minutes from what would be expected with unrestricted tidal conditions. Even wide breaches (Alternatives 3W and 4b) produced a slight delay due to the distance from the mouth of McAllister Creek. For Alternative 4b, the 50% restoration alternative in which the dikes were retained and very wide breaches added, the peak water surface elevation and timing of the tide phase were not significantly decreased. However, the wide breaches apparently reduced outflow during the receding tide, so stored water could not completely drain, leaving ponding within the restored area and in the unfilled borrow ditches. Leaving the borrow ditches unfilled (Alternatives 3, 3W, and 4b) also showed that tidal waters were partially diverted into the borrow ditches on incoming tides, affecting tidal circulation in sloughs.

Flooding: During extreme flood conditions, the Nisqually River overtops its banks upstream of the Refuge, on the south side of the I-5 bridge. The water inundates the floodplain and flows into the diked area, with approximately 70% of flood waters entering the southeast corner of the Refuge through a channel and opening under I-5 and about 30% entering through an overflow channel adjacent to McAllister Creek. All alternatives showed flooding in the diked area under 1996 flood conditions. The alternatives that restored 70% and 80% of the diked area and eliminated cross dikes along the McAllister Creek side of the Refuge reduced flood impacts to the Refuge. These alternatives allowed flood waters from the McAllister Creek overflow channel to empty unimpeded into the McAllister Creek tidal system, instead of emptying inside of diked habitat. However, diked areas in all alternatives were still flooded by flows from the overflow channel at the southeast corner of the Refuge.

Water Velocities and Bed Shear: Water velocities in tidal channels outside the dike under current conditions (status quo) were lower than restored alternatives where dikes were removed. This illustrates one of the effects of diking, where tidal channels outside the dike have a reduced tidal prism or volume because of the loss of tidal area. Alternatives that created new crossdikes that blocked tidal channels created this same backwater effect, producing a reduced volume or flow in tidal channels than would occur in a system without dikes. Alternatives with no crossdikes along McAllister Creek (70% and 80% alternatives) alleviated this effect, producing fuller tidal flow in the sloughs and channels along McAllister Creek.

Water velocities and bed shear, another measure of potential erosion, were much higher in fixed breaches, as compared to unrestricted tidal channels where dikes were removed. This illustrates the difficulty in protecting fixed breaches from eroding or widening, especially during flood conditions. In addition, velocities in the Nisqually River were confirmed to be much higher at large bends in the river, particularly during flood conditions, illustrating the highly erosive conditions that lead to dike failures, when these high velocities are forced to stay within constricted channels.

Salinity: Salinity patterns were only modeled for two tidal cycles. Longer simulations may show greater salinity penetration. Alternatives where dikes were breached and retained showed less salinity penetration in the restored area. Less salinity penetration was also observed in McAllister Creek in a 50% alternative, due to the dike constriction along McAllister Creek, which reduced tidal flow up McAllister.

Sedimentation: Sediment loads are small in the Nisqually River, McAllister Creek, and the Nisqually Reach during near annual flow conditions. Maximizing sediment deposition in restored areas is important to enhance success in a sediment-poor system like the Nisqually delta. The major source of sediments comes down the Nisqually River during flood events, when large amounts of sediment are carried in flood waters. An extended simulation period may be needed to evaluate more long-term deposition patterns; however, deposition during the 1996 flood event provides an example of potential sedimentation patterns. Dike configuration affected sediment deposition patterns. In general, alternatives where more dike was removed along the Nisqually River showed more sediment deposition along the river and in restored areas. Alternative 3, which had narrow dike breaches, showed little sediment deposition.

Conclusions

The model was very useful in evaluating various estuarine restoration scenarios, using a variety of dike configurations. Full tidal penetration occurred when dikes were removed to grade and the borrow ditch filled. Narrow breaches restricted tidal flow, reducing water surface elevations on incoming tides and delaying tidal flows. Breaches greater than the width of channel openings also allowed full tidal penetration, but stored water did not completely drain in receding tides, resulting in ponding in marshes and borrow ditches. Borrow ditches partially diverted incoming tidal flows when left unfilled, affecting circulation in restored tidal channels. Restoration scenarios retaining dikes with breaches also reduced sedimentation and altered salinity patterns. Water velocities and bed shear in channels moving through dike breaches indicated that fixed breaches may be difficult to protect from erosion.

Flooding upstream of I-5 is not expected to be adversely impacted by habitat restoration. Alternatives resulting in 70% and 80% estuarine restoration reduced flooding in the diked area, by allowing the McAllister overflow channel to empty directly into McAllister Creek. Salinity tended toward marine conditions, but some brackish areas may occur near the margins of marine water penetration. The Nisqually River is a sediment-poor system, due to dams upstream on the Nisqually River which trap much of the sediments. However, during flood events, the Nisqually River provides a major source of sediment. Dike configurations with more dike removed along the River allowed a greater amount of sediment to deposit in the restored area.

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Appendix K

Land Protection Plan

LAND PROTECTION PLAN

Nisqually National Wildlife Refuge Thurston and Pierce Counties, Washington

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APPENDIX K

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Land Protection Plan

Nisqually National Wildlife Refuge

Thurston and Pierce Counties, Washington
May 2002

1.1 INTRODUCTION

The U.S. Fish and Wildlife Service (Service) has prepared this Land Protection Plan identifying the habitat protection methods that could take place for lands within Alternative D (Preferred Alternative) described in the Comprehensive Conservation Plan and Environmental Impact Statement (EIS) and for lands within the approved boundary of the Nisqually National Wildlife Refuge (Refuge). This plan also includes a priority listing of lands to be considered for acquisition within the proposed boundary and within the approved boundary.

1.2 PROJECT DESCRIPTION

Nisqually Refuge is located in Thurston and Pierce counties along southern Puget Sound (EIS, Figure 1.1-1). The Refuge was established in 1974 to protect the existing estuary from development. The approved Refuge boundary is approximately 3,936 acres. The acquisition program is ongoing and the Service has acquired approximately 2,925 acres in fee title, conservation easements, and leases to date within the approved refuge boundary. Non-refuge lands within the approved boundary total approximately 1,011 acres.

The proposed expansion would add approximately 3,479 acres for a total authorized boundary of 7,415 acres. The expansion would include 512 acres of upland habitat and 2,963 acres of floodplain, riparian, and wetland habitat. The boundary would increase habitat protection on the East Bluff north of I-5 to include a forested corridor. It would also extend the boundary south of I-5 to include floodplain, bluff, wetland, and upland forested habitats along the Nisqually River and McAllister Creek.

McAllister Creek Area: McAllister Creek originates from springs and seeps located approximately 3 miles south of Interstate 5 (I-5). It flows northerly along the base of forested bluffs, passing through the Refuge and emptying into Puget Sound. Medicine Creek originates near the Nisqually River and meanders west through developments and agricultural lands until it meets McAllister Creek.

Early in the century, the area surrounding the southern portions of McAllister Creek was likely covered with riparian forest habitat and freshwater wetlands until the majority of it was harvested, diked, and drained for use as cropland and pasture. Today, much of the McAllister

Creek watershed south of I-5 continues to be maintained as pasture and cropland with dikes. The area contains freshwater wetlands in the form of potholes and upland depressions. Wetland vegetation includes sedge stands, cattails, bulrushes, willows, salmonberry, and skunk cabbage. The headwater springs of McAllister Creek are surrounded by upland forest habitat consisting primarily of second growth Douglas-fir. The agricultural lands would provide grassland habitat and restoration opportunities for riparian forest habitat and freshwater wetlands.

The agricultural lands south of I-5 are currently used by migratory waterfowl for foraging and resting during localized flooding events in the fall and winter period. Common waterfowl species include American wigeon, mallards, pintails, green-winged teal, and Canada geese.

As the high tides cover the estuary, shorebirds are pushed inland and can be found using the agricultural lands along McAllister Creek. Typical shorebird species found include dunlin, dowitchers, western and least sandpipers, common snipe, and yellowlegs.

The creek historically contained seven species of salmon and trout, specifically chinook, coho, chum, and pink salmon, cutthroat and bull trout, and steelhead. Remnant runs of chinook, coho, and chum salmon, bull trout, and steelhead continue to return.

East Bluffs: The bluffs located along the eastern edge of the study area are covered with upland forest dominated by conifers. Douglas-fir is predominant, mixed with bigleaf maple, western hemlock, and red alder. The area drains directly into that portion of the Nisqually River located within the Refuge. The forest habitat located in the east bluff area provides habitat for passerines, woodpeckers, and raptors. A bald eagle nest has been reported on the bluff. The area also serves as a migration corridor for mammal species moving from one habitat to another.

Nisqually Valley and River Corridor: The Nisqually Valley and River corridor consists of agricultural lands, freshwater wetlands, and the riparian corridor contained within upland bluffs on the east rising from the river valley. The riparian corridor contains relatively undisturbed floodplain forest, backwater areas, and freshwater wetlands. Black cottonwood, red alder, bigleaf maple, Douglas-fir, and western red cedar are the dominant tree species found in the riparian corridor. The statewide significance of this area is documented in a proposal completed by The Nature Conservancy in December of 1993 which proposed the establishment of a Research Natural Area along a portion of the Nisqually River. The forested bluffs in the Nisqually River portion of the area include species such as red alder and bigleaf maple, with scattered coniferous species including Douglas-fir and western red cedar and is located on the east side of the Nisqually River.

The large and relatively undisturbed floodplain forest, backwater areas, and freshwater wetlands along the corridor provide an exceptionally productive ecosystem. Examples of species that use these types of habitats are the Pacific giant salamander, red-legged frog, tailed frog, great blue heron, harlequin duck, wood duck, belted kingfisher, American dipper, water vole, beaver, and

river otter. The threatened marbled murrelet has been seen along the corridor and other inhabitants include passerines, woodpeckers, and raptors.

Ten species of salmonids occur in the Nisqually River system. Chum, coho, and chinook salmon and steelhead all have distinct and healthy stocks in the river, although these runs are decreasing. The Nisqually River chinook is listed as threatened under the Endangered Species Act. Historical populations of bull trout, currently listed as threatened in Puget Sound, may exist in the Nisqually River.

1.3 THREAT TO OR STATUS OF THE RESOURCE

The South Puget Sound area is experiencing rapid growth in residential, resort, and recreational development. Many of these developments threaten the integrity of coastal ecosystems that support existing fish and wildlife populations.

The agricultural land in the McAllister Creek drainage falls within Thurston County, Washington. Thurston County recently purchased development rights on an estimated 840 acres from several of the landowners in an attempt to preserve the agricultural emphasis of the area and to prevent development of high density residential housing. The restricted development rights do allow for the conversion of agricultural lands into plant nurseries which are becoming popular in Washington. Currently, the agricultural lands contain some habitat values for migratory birds and small mammals. Conversion of these lands into nurseries occupied with greenhouses would essentially eliminate habitat values.

Some of the area along the Nisqually River falls within the Fort Lewis Military Reservation and is an excellent example of native bottomland riparian forest habitat. Unregulated use by the public has resulted in the creation of dirt roads along some of the river corridor. This unregulated use is causing habitat degradation and threatens the integrity of the native habitat. A limited amount of military training occurs in a portion of the proposed Research Natural Area.

Thurston County, located west of the Nisqually River, requires a 200-foot setback from the bluffs because of a concern for unstable soil conditions along the bluffs. Pierce County, located east of the Nisqually River, allows for construction along the top of the bluff with no required setback. Weyerhaeuser Company currently has plans to develop approximately 400 acres along the top of the bluffs, adjacent to the eastern boundary of the Refuge. There is a concern that developments adjacent to the top of the bluffs would cause increased siltation with corresponding degradation of water quality in the Nisqually Delta, fragment habitat, and compromise the visual landscape of the bluffs from the Refuge and other parts of the delta.

1.4 PURPOSE OF THE PROPOSED EXPANSION

When Nisqually Refuge was established in 1974, the original boundary was designed to protect the Delta from specific threats of development. During the ensuing 25 years, increased development has resulted in habitat loss and degradation throughout the Puget Sound area,

including the lower Nisqually watershed, contributing to declines of many fish and wildlife species. Refuge expansion would help alleviate the effects of increased habitat degradation, loss, and development pressures in adjacent parts of the lower watershed. Expanding the approved Refuge boundary would allow the Service to negotiate with willing participants within the new approved boundary to acquire lands or interests in land and water. Lands, or interests in lands acquired by the Service, would be managed as a part of the National Wildlife Refuge System (System). The System is the largest collection of lands specifically managed for fish and wildlife habitat. The needs of wildlife and their habitats come first on refuges, in contrast to other public lands managed for multiple uses.

The administration, management, and growth of the System are guided by the following goals: 1) preserve, restore, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered, 2) perpetuate migratory bird, inter-jurisdictional fish, and marine mammal populations, 3) preserve a natural diversity of fish, wildlife, and plants, 4) preserve and restore representative ecosystems of the United States, including the natural processes characteristic of those ecosystems, and 5) foster understanding and instill appreciation of fish, wildlife, and plants, and their conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public uses. Such uses includes hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

The Nisqually Refuge falls within the North Pacific Coast Ecoregion. The Service's goal for the North Pacific Coast Ecoregion is to protect, restore, and enhance the function, structure, and species composition of ecosystems for fish and wildlife conservation and the continuing benefit of people by implementing an ecosystem approach to management. This goal will be attained to the degree that the Service, working through partnerships, can 1) minimize species extinction, 2) reverse population declines, 3) maintain and enhance healthy populations of native fish and wildlife, 4) provide people with healthy ecosystems, and 5) work with our partners and the public at all levels.

The objectives of the Ecoregion are to 1) maintain high biological productivity, reverse population declines, and recover federally listed species, 2) combine and coordinate Federal, State, local, tribal, and private watershed restoration efforts on a holistic ecosystem approach across ownership boundaries, 3) increase awareness and knowledge of fish and wildlife issues and ecosystem management, and 4) provide state-of-the-art biological data to resource managers and partners to restore functioning watersheds.

The expansion of the Nisqually Refuge would help achieve Ecoregion goals and objectives by 1) protecting and restoring habitat for declining populations of anadromous fish, including the federally listed chinook salmon and the federally listed bull trout, 2) enhancing and contributing to existing habitat protection efforts by the Nisqually Tribe, Fort Lewis Military Reservation, Thurston and Pierce counties, Nisqually River Council, Nisqually River Basin Land Trust, and local conservation organizations, 3) providing a diversity of native habitats that will maintain and enhance healthy populations of fish, wildlife, and plant species native to the Nisqually River delta, and 4) providing additional quality wildlife-dependent public use opportunities.

Refuge expansion would contribute to achieving Refuge goals including 1) to conserve, manage, restore, and enhance native habitats and associated plant and wildlife species representative of the Puget Sound lowlands with a special emphasis on migratory birds and salmon, 2) support recovery and protection efforts for Federal and State threatened and endangered species of concern, and their habitats, 3) provide quality environmental education opportunities focusing on fish, wildlife, and habitats of the Nisqually River delta and watershed, and 4) provide quality wildlife-dependent recreation, interpretation, and outreach opportunities to enhance public appreciation, understanding, and enjoyment of fish, wildlife, habitats, and cultural resources of the Nisqually River delta and watershed.

The authorities for the proposed expansion include the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742(a)-754) and the Migratory Bird Conservation Act of 1929 (16 U.S.C. 715-715d). The Fish and Wildlife Act of 1956 authorizes the Service to use funds made available under the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601-4601-11) to acquire lands, waters, or interests therein for fish and wildlife conservation purposes. Federal monies used to acquire private lands through the Land and Water Conservation Fund are derived primarily from oil and gas leases on the outer continental shelf, excess motorboat fuel tax revenues, and the sale of surplus Federal property.

1.5 LAND PROTECTION METHODS

1.5.1 Willing Seller Policy

It is the policy of the Service to acquire lands from willing landowners. Landowners within the approved Refuge boundary who do not wish to sell their property or any other interest in their property are under no obligation to negotiate with or sell to the Service. In all acquisitions, the Service is required by law to offer 100 percent of fair market value, as determined by an appraisal completed by a professional, certified appraiser, in accordance with the Uniform Appraisal Standards for Federal Land Acquisitions.

The Service, like other Federal agencies, has the power of eminent domain. Eminent domain allows the use of condemnation to acquire lands and other interest in lands, such as easements, for the public good. The Service rarely uses this power. The Service typically is not compelled to buy specific land within a certain time frame.

Under the Uniform Relocation Assistance and Real Property Acquisition Policies Act, landowners who sell their property to the Service may be eligible for certain payments. Determinations are made on a case by case basis.

1.5.2 Habitat Protection Methods

A variety of habitat protection methods can be used to preserve fish and wildlife habitat. The actual method selected for any individual parcel will depend upon both the needs and desires of

the landowner and the Refuge. If a mutual agreement cannot be reached, the landowner retains full use, control, and responsibility for the property. Cooperative efforts with Fort Lewis could involve key partners, including the Nisqually Indian Tribe. Techniques to provide improved protection of USA Trust lands would be restricted to cooperative agreements.

Cooperative Agreements. The Service can enter into cooperative agreements with landowners to improve wildlife habitat management. Cooperative agreements may specify shared responsibilities, or a transfer of funds from the Service to another entity or vice-versa for management purposes. Cooperative agreements can be applied to land under any type of ownership.

Conservation Easements. Conservation easements transfer some, but not all property rights to the Service as specified by mutual agreement. Under a conservation easement, a landowner could agree not to engage in activities damaging to wildlife habitat resources, and/or the Service could manage the land for wildlife. The Service can acquire easements through purchase, donation, or exchange. The property owner retains all responsibility for paying property taxes. The Service could negotiate conservation easements on land under any type of ownership.

Fee Title Acquisition. A fee title interest is normally acquired when 1) the fish and wildlife resources on a piece of property require permanent protection that is not otherwise available, 2) the property is needed for development associated with public use, 3) a pending land use could otherwise harm wildlife habitats, or 4) purchase is the most practical and economical way to assemble small tracts into a manageable unit. Fee title acquisition transfers all property rights held by the landowner to the Federal government. A fee title interest may be acquired by purchase, donation, or exchange.

1.6 LAND PROTECTION PRIORITIES

Tables 1 and 2 list the lands within the preferred expansion boundary and within the approved Refuge boundary, respectively, by tract number, inset map, total acres, priority and possible method(s) for resource protection (ownership information is from the Pierce and Thurston County Assessor Offices and subject to change). Priorities (1, 2, or 3) are assigned to each tract, 1 being the highest and 3 the lowest in consideration. Tracts are being considered for acquisition because of their biological significance, existing or potential threats to wildlife habitat, significance of the area to refuge management and administration, and/or existing commitments to purchase or protect the land. Landowners within the proposed Refuge boundary and approved Refuge boundary may or may not wish to participate in the Service's habitat protection objectives, or may not wish to divest themselves from their land management responsibilities. Based on this, the final configuration of the acquired lands is impossible to predict. But because the parcels have been identified and the potential effects of converting those lands to refuge status have been assessed in the EIS, the delineated proposed expansion boundary will provide the Service with future habitat protection options if willing sellers and participants and available funds present themselves in the future.

1.7 COORDINATION

The Service worked with a variety of interested parties to identify issues and concerns associated with the proposed Refuge expansion. These interested parties included members of the public, interested private groups, landowners, elected officials, and State, Federal, Tribal, and local government agencies. The Service's public involvement activities included hosting public scoping meetings, developing and mailing planning updates, requesting information, undertaking consultations, and responding to inquiries. The Service provided information about the proposal to the media and other interested or affected parties throughout the public scoping period (EIS, Chapter 6).

1.8 SOCIAL AND CULTURAL IMPACTS

The current quality of life for communities and individuals around the proposed additions to the Refuge is expected to be the same or better as a result of the Refuge addition. Intensified management would increase habitat quality and improve wildlife use which would result in positive effects for wildlife observation, interpretation, and photography opportunities at the Refuge. Improvements will also enhance environmental education opportunities, particularly the opportunity to observe active habitat restoration/management activities. In addition, enhanced waterfowl and fish habitats may encourage more waterfowl and fish to use the delta, improving waterfowl hunting and fishing opportunities (EIS, Chapter 4, section 4.6.4.1).

The Refuge environmental education program would be expanded to accommodate up to 15,000 students per year. The trail length would be shortened from the current 5½- mile loop trail to a 3½- mile round trip (non-loop) trail but of improved quality with diversified viewing opportunities. A new eastside trail would also be constructed. A trail would be established on the East Bluff if appropriate lands were acquired. Approximately 191 acres of the Refuge would be open to a quality waterfowl hunting program. Walk-in hunting opportunities would be considered south of I-5 if sufficient lands were acquired to allow for adequate wildlife sanctuary and minimal conflicts with other priority public uses. Bank fishing opportunities would be investigated along McAllister Creek south of I-5, if appropriate sites were acquired. This would provide new bank fishing access to help compensate for the loss of McAllister Creek bank fishing north of I-5 as a result of estuarine restoration, although the scheduled closure of the McAllister Creek Hatchery (July 2002) would reduce fishing opportunity, thereby lessening the effects of this loss. New fishing access at Luhr Beach and Nisqually River would be provided. Overall, the fishing opportunity at Nisqually Refuge is not expected to decrease (EIS, Chapter 4, section 4.6.4.3).

The Nisqually Indian Tribe would continue to hunt, fish, and gather. There are no anticipated adverse health or environmental effects to the Nisqually Indian Tribe from refuge expansion (EIS, Chapter 4, section 4.8.1).

Recreation economic expansion is expected to be proportionate to increased recreation and public access resulting from Refuge expansion. Increased revenue for the Refuge and region would depend on what lands were acquired. The effects of new facilities, new trails, improved habitat, and more student visits would be expected to contribute to an increasing trend in visitation, producing increased economic benefits (EIS, Chapter 4, section 4.8.4.4).

Approximately 1,100 acres of agricultural land in Thurston County and 190 acres in Pierce County could be acquired for conservation uses. Within Thurston County, approximately 840 acres are within the existing Purchase of Development Rights program. Expansion of the Refuge could result in the reduction of grazing opportunities and the conversion of some agricultural lands to wetlands and riparian habitats, but the impact to the overall agricultural economies of these counties would be minor.

The salary and operating costs for the Refuge with a fully implemented Comprehensive Conservation Plan would be approximately \$1.8 million dollars, \$1.2 million above current expenditure, which would be directed towards the Refuge payroll and operational costs and contribute directly to the regional economy. There would be an indirect support of approximately 55 jobs in the regional economy (EIS, Chapter 4, section 4.8.3.4). In the context of the robust economies of Thurston and Pierce counties, these increases would be minor.

Table 1. Land Protection Priorities for Expansion Area					
TRACT #	OWNER NAME	Figure #	PRIORITY	ACRES	PROTECTION METHODS
1,a,b	USA-ARMY	3,4,5	3	1083.00	Fee, Coop Agree, Easement
2f,g	WASH STATE-DEPT OF GAME	2,6	3	3.72	Coop Agree, Fee
2h	WASH-FISHERIES DEPT	4	3	8.09	Coop Agree
2i	WASH STATE-FISH HATCHERY	5	3	8.09	Coop Agree
3	THURSTON, COUNTY OF	3	3	0.24	Fee, Coop Agree, Easement
3a	THURSTON, COUNTY OF	4	3	6.06	Fee, Coop Agree, Easement
4	LACEY, CITY OF	4	3	0.18	Coop Agree
5	OLYMPIA, CITY OF	5	3	176.33	Coop Agree
6	FIRE DISTRICT #3	3	3	1.00	Fee, Coop Agree, Easement
12c,d	WEYERHAEUSER	2	1	175.24	Fee, Coop Agree, Easement
19c,d,g,h	NISQUALLY INDIAN TRIBE	2,5	3	419.72	Easement
51	HOLLISON, ROBERT AND KATHLEEN	2	1	18.74	Fee, Coop Agree, Easement
52	BENNAR, RAY AND GLENDA	2	2	1.76	Fee, Coop Agree, Easement
53	LEIGH, JOANN	2	2	1.15	Fee, Coop Agree, Easement
54	MEGEE, KATHLEEN	2	2	2.00	Fee, Coop Agree, Easement
55	MCBRIDE, ALBERT E. JR	2	2	12.27	Fee, Coop Agree, Easement
56	NISQUALLY RIVER LAND TRUST	2	1	12.99	Fee, Coop Agree, Easement
57	Unknown	2	1	unk	Fee, Coop Agree, Easement
58,a	BRIDGES, TERESA M	3	2	99.63	Fee, Coop Agree, Easement
59	WALKER, LESTER B	3	3	0.69	Fee, Coop Agree, Easement
60	SCOTT, CINDY	3	3	0.88	Fee, Coop Agree, Easement
61	ALVESTAD, CAREY D ETAL	3	3	0.81	Fee, Coop Agree, Easement
62	GOTTFRIEDSON, HENRY F/ALISON K	3	3	1.00	Fee, Coop Agree, Easement
63	MATHEWS, MAUREEN H	3	3	1.02	Fee, Coop Agree, Easement
64	DERICKSON, DOUGLAS	3	3	0.24	Fee, Coop Agree, Easement
65	TAYLOR, GARY/JANET	3	3	0.47	Fee, Coop Agree, Easement
66	FRANK, WILLIE	3	3	6.00	Fee, Coop Agree, Easement
67	BLACK, JEFFREY S/CONNIE M	3	3	0.52	Fee, Coop Agree, Easement
68	CLEMENT, KENDALL S & MARIBETH	3	3	1.00	Fee, Coop Agree, Easement
69	BRUDER, TERESA/RUSS	3	3	1.18	Fee, Coop Agree, Easement
70	ROESSNER, DEBRA D	3	3	0.92	Fee, Coop Agree, Easement
71	LOVIK, DENA L	3	3	0.61	Fee, Coop Agree, Easement
72	BOHREN, PATTI	3	3	1.36	Fee, Coop Agree, Easement
73	COLE, CLARA M	3	2	3.61	Fee, Coop Agree, Easement
74	MILLER, RHETT	3	2	0.83	Fee, Coop Agree, Easement
75	CAMPBELL, LOIS M	3	2	3.40	Fee, Coop Agree, Easement
76	MC GILLIS, JOHN W	3	3	0.50	Fee, Coop Agree, Easement
77	LOSEY, DAVID L/SHARON	3	3	1.00	Fee, Coop Agree, Easement
78	GRASSI, NELLO L	3	2	4.12	Fee, Coop Agree, Easement
79	TATE, JOHN & JUANITA D	3	2	13.79	Fee, Coop Agree, Easement
80	LYON, MICHAEL/JUDY	3	3	0.49	Fee, Coop Agree, Easement
81	BREDESEN, CHRISTOPHER L.	3	2	11.80	Fee, Coop Agree, Easement
82	DOERING, AARON M/AMY L	3	2	0.50	Fee, Coop Agree, Easement
83	PIETRZAK, PAUL R	3	2	1.03	Fee, Coop Agree, Easement
84,a	SAYONC, BETTY L	3	2	11.91	Fee, Coop Agree, Easement
85	LEAMAN, H DENNIS	3	2	2.11	Fee, Coop Agree, Easement
86	COOTS, DEAN E	3	2	2.72	Fee, Coop Agree, Easement
87	SNELL, LLOYD E & ROSE M	3	1	5.56	Fee, Coop Agree, Easement
88	NYE, TIMOTHY S JR	3	1	1.01	Fee, Coop Agree, Easement
89	SCHMAUDER, ALLEN	3	1	0.50	Fee, Coop Agree, Easement
90	COLLINS, JAMES R/JODI K	3	1	0.86	Fee, Coop Agree, Easement

Table 1. Land Protection Priorities for Expansion Area					
TRACT#	OWNER NAME	Figure#	PRIORITY	ACRES	PROTECTION METHODS
91	ATTWOOD, SALLY J	3	1	1.17	Fee, Coop Agree, Easement
92	ATTWOOD, LARRY E	3	1	1.40	Fee, Coop Agree, Easement
93	KRISHNAMOORTI, SIGNA R	3	1	7.61	Fee, Coop Agree, Easement
94	WARREN, DOROTHY G	3	2	7.47	Fee, Coop Agree, Easement
95	SCOTT, CHAE AN	3	2	7.18	Fee, Coop Agree, Easement
96	HONG, CHANLIP MAN	3	2	10.03	Fee, Coop Agree, Easement
97	SAYONC, HELEN F	3	2	3.58	Fee, Coop Agree, Easement
98	HILL, DOROTHY R	3	2	2.76	Fee, Coop Agree, Easement
99	CHOJNOWSKI, DANIEL/PATRICIA	3	2	1.71	Fee, Coop Agree, Easement
100	BROWN, JAMES C	3	2	7.69	Fee, Coop Agree, Easement
101	HUNGERFORD, WILLIAM E	3	2	12.86	Fee, Coop Agree, Easement
102	MC QUEEN, BRUCE & PATRICIA	3	3	0.78	Fee, Coop Agree, Easement
103,a	DAVIS, SCOTT A	3,4	3	3.55	Fee, Coop Agree, Easement
104	DAVIS, KARIN K	3	3	2.29	Fee, Coop Agree, Easement
105	GLASTETTER, HOWARD/COLLEEN	3	3	1.52	Fee, Coop Agree, Easement
106	ALLEN, DONNA L	3	3	0.21	Fee, Coop Agree, Easement
107	FLYNN, MARGARET E	3	3	0.22	Fee, Coop Agree, Easement
108	BELT ENT INC	3	3	0.23	Fee, Coop Agree, Easement
109	BREWER, LARRY	3	3	0.18	Fee, Coop Agree, Easement
110	CHURILLA, ROBERT J/GLENDA F	3	3	0.31	Fee, Coop Agree, Easement
111	BALCOM, MABEL I	3	3	1.02	Fee, Coop Agree, Easement
112	GEORGE, HAROLD F	3	3	1.62	Fee, Coop Agree, Easement
113	WICK, ROLF F	3	3	0.54	Fee, Coop Agree, Easement
114	SHERMAN, JACK E/CARRIE L	3	3	0.91	Fee, Coop Agree, Easement
115	CLINTON, JON P	3	3	0.23	Fee, Coop Agree, Easement
116	SHEAK, MARGARET	3	3	0.53	Fee, Coop Agree, Easement
117	HUNGERFORD, WILLIAM E ETUX	3	3	0.02	Fee, Coop Agree, Easement
118	RODRIGUES, DENNIS/IRENE	3	3	0.50	Fee, Coop Agree, Easement
119	CHRISTOFFER, JEROLD F ETUX	4	2	2.00	Fee, Coop Agree, Easement
120	GOHEEN, BRYAN C/SYLVIA	4	3	0.66	Fee, Coop Agree, Easement
121	BODEN, DAVID W	4	3	0.51	Fee, Coop Agree, Easement
122	YOUNG, RICKEY M/GISELA	4	3	0.45	Fee, Coop Agree, Easement
123	CHAMBERLAIN, JESSIE M ET AL	4	3	0.54	Fee, Coop Agree, Easement
124	DEAN, MARY LOUISE	4	3	0.30	Fee, Coop Agree, Easement
125	LIPSCOMB, C JEAN	4	3	0.39	Fee, Coop Agree, Easement
126	COOPER, RUBY M	4	3	0.58	Fee, Coop Agree, Easement
127	WATSON, ELIZABETH	4	3	1.20	Fee, Coop Agree, Easement
128	SMITH, JOANN M	4	3	0.63	Fee, Coop Agree, Easement
129	LEGWOLD, ROCKY L	4	1	0.52	Fee, Coop Agree, Easement
130	ANDERSON, KENNETH A	4	3	0.37	Fee, Coop Agree, Easement
131	ANDERSON, LEE D ETAL	4	3	0.24	Fee, Coop Agree, Easement
132	SCHRUM, JOSEPH A/DEVON L	4	3	0.12	Fee, Coop Agree, Easement
133	WATTS, KELLY L/SUSAN A	4	3	0.32	Fee, Coop Agree, Easement
134	MELBY, WARD R ETAL	4	1	0.81	Fee, Coop Agree, Easement
135	PHILLIPS, DOUGLAS S	4	1	0.34	Fee, Coop Agree, Easement
136	STENKLYFT, JAMES A	4	1	0.27	Fee, Coop Agree, Easement
137	NISQUALLY SPORTSMEN CLUB	3,5	1	68.94	Fee, Coop Agree, Easement
138	ANDERSON, LAURIE	5	1	15.16	Fee, Coop Agree, Easement
139	EBERLING, MARSHALL E	5	2	0.97	Fee, Coop Agree, Easement
140	LONERGAN, GEORGE A	5	1	5.00	Fee, Coop Agree, Easement

Table 1. Land Protection Priorities for Expansion Area					
TRACT#	OWNER NAME	Figure#	PRIORITY	ACRES	PROTECTION METHODS
141	WESTBERG, RAY	5	2	1.06	Fee, Coop Agree, Easement
142	CORP OF LATTER DAY SAINTS	5	1	38.34	Fee, Coop Agree, Easement
143	BLENCOE, LUCILLE M	5	1	37.94	Fee, Coop Agree, Easement
144,a	REESE, GARY FULLER	3,5	1	89.04	Fee, Coop Agree, Easement
145	BABARE, GEORGE M	5	1	107.48	Fee, Coop Agree, Easement
146	WASH DIV INV CORP	3,4	1	0.74	Fee, Coop Agree, Easement
149,a	STOKER, GERRIT	3	1	74.25	Fee, Coop Agree, Easement
150	NISQUALLY PLAZA RV PARK	3	3	1.80	Fee, Coop Agree, Easement
151,a,b	ELWESS, GENE/ANNIE	3	3	5.96	Fee, Coop Agree, Easement
152	SINGH, BAJINDER ETAL	3	3	0.51	Fee, Coop Agree, Easement
153,a	JACOBS, JAMES A	3	3	1.09	Fee, Coop Agree, Easement
154	THREATT, LORENA E	3	3	0.51	Fee, Coop Agree, Easement
155	ALL MARINE INC	3	3	0.64	Fee, Coop Agree, Easement
156	BRESSI, PAUL M	3	3	0.46	Fee, Coop Agree, Easement
157	SCHILTER, JEFF AND STEPHANIE	3	2	5.16	Fee, Coop Agree, Easement
158,a,b	SCHILTER, GOTTFRIED J	3	1	73.53	Fee, Coop Agree, Easement
159	INDUSTRIAL FORESTRY	3	1	9.36	Fee, Coop Agree, Easement
160	HAI DUCEK, TIMOTHY J/JOY E	3	2	2.75	Fee, Coop Agree, Easement
161	Unknown	3	2	0.72	Fee, Coop Agree, Easement
162	Unknown	3	2	0.46	Fee, Coop Agree, Easement
163	GABLE, ADRIAN L	3	2	0.25	Fee, Coop Agree, Easement
164	WESTLIN, BERTHA L ESTATE	3	2	1.66	Fee, Coop Agree, Easement
165,a-d	THOMSEN JESS INC	3,5	1	740.06	Fee, Coop Agree, Easement
166	TORDEN, THOMSEN, INC	3,5	1	68.36	Fee, Coop Agree, Easement
167	ROLLER, JON/GAIL	5	1	6.54	Fee, Coop Agree, Easement
168	HILL, JAMES J	3,5	1	0.50	Fee, Coop Agree, Easement
169	HILL, PAUL	3,5	1	1.00	Fee, Coop Agree, Easement
170,a,b	SCHOLS, HERMAN	3,5	1	124.02	Fee, Coop Agree, Easement
171	BROUGH, ROGER D	5	2	1.00	Fee, Coop Agree, Easement
172	KOHLBERG, DAVID/ELIZABETH	5	1	1.78	Fee, Coop Agree, Easement
173	LONCAR, PAUL	5	1	5.50	Fee, Coop Agree, Easement
174	VO, TRI M/TRINH, DUNG K	5	1	43.94	Fee, Coop Agree, Easement
175,a	NIELSEN PACIFIC LTD	5	2	290.43	Fee, Coop Agree, Easement
176	WARD, HUGO F	5	1	40.00	Fee, Coop Agree, Easement
177	MYERS, JAMES H	5	1	40.17	Fee, Coop Agree, Easement
178	PIGMAN, DEAN A	5	1	9.80	Fee, Coop Agree, Easement
179	WILLETTE, JON F/GUILA K	5	1	7.86	Fee, Coop Agree, Easement
180	LOFTIN, FRED E	5	3	4.18	Fee, Coop Agree, Easement
181	LOFTIN, CLAIRE	5	2	3.55	Fee, Coop Agree, Easement
182,a	SMIT, JULIE L	5	3	3.80	Fee, Coop Agree, Easement
183,a	BARATZ, JULIUS/LOIS TSTEEES	5	3	6.29	Fee, Coop Agree, Easement
184	BERG, JERI L	5	2	97.59	Fee, Coop Agree, Easement
185	GATZKA, JOSEPH A.	5	2	0.73	Fee, Coop Agree, Easement
186,a,b	MCALLISTER CREEK ASSN	5	2	1.06	Fee, Coop Agree, Easement
187	SUTTON, ROBERT JR./CRISTAN	5	2	0.90	Fee, Coop Agree, Easement
188	SELDOMRIDGE, CHARLES B.	5	2	1.17 ++	Fee, Coop Agree, Easement
189	OSTREICH, TROY D.	5	2	0.34	Fee, Coop Agree, Easement
190	DONALLY, ELFRIEDE H.	5	2	0.77	Fee, Coop Agree, Easement
191	MATTESON, JON MICHAEL	5	2	0.22	Fee, Coop Agree, Easement
192	EVANS, WILLIAM/KATHLEEN	5	2	0.59	Fee, Coop Agree, Easement
193,a	BRAGET TRUSTEE, AGNES	5	2	1.54	Fee, Coop Agree, Easement

Table 1. Land Protection Priorities for Expansion Area					
TRACT#	OWNER NAME	Figure#	PRIORITY	ACRES	PROTECTION METHODS
194	BOEHM, FREDERICK/MICHELLE	5	2	0.39	Fee, Coop Agree, Easement
195	ZEUTENHORST, PHILLIP	5	2	0.44	Fee, Coop Agree, Easement
196	CIRRITO, CAROLYN B.	5	2	0.64	Fee, Coop Agree, Easement
197	PITTMON, JOANN/DOUGLAS	5	2	0.43	Fee, Coop Agree, Easement
198	MACY, MARSHALL/DEBORAH	5	2	0.82	Fee, Coop Agree, Easement
199	KOHLENBERG, DAVID/ELIZABETH	5	2	1.03	Fee, Coop Agree, Easement
200	SCHOLS, MARIANN J.	5	2	0.60	Fee, Coop Agree, Easement

Table 2. Land Protection Priorities for Inholdings					
TRACT #	OWNER NAME	Figure #	PRIORITY	ACRES	PROTECTION METHODS
19,a,b	NISQUALLY INDIAN TRIBE	6	1	330	Coop Agree
2, a-c	WASH-GAME DEPT	6	1	625	Coop Agree
13	CROUSE, CARL N/GLORIA	6	1	1	Fee, Coop Agree, Easement
16b,c	BABARE, ROBERT	6	1	34	Fee, Coop Agree, Easement
17	MOE, GREGORY	6	1	1	Fee, Coop Agree, Easement
22	EAGLE CLIFFS SUBDIVISION	6	3	30	
25	BORLEY, CLARENCE	6	1	3	Fee, Coop Agree, Easement
27	MARTIN, JAMES A/MARY D	6	1	4	Fee, Coop Agree, Easement

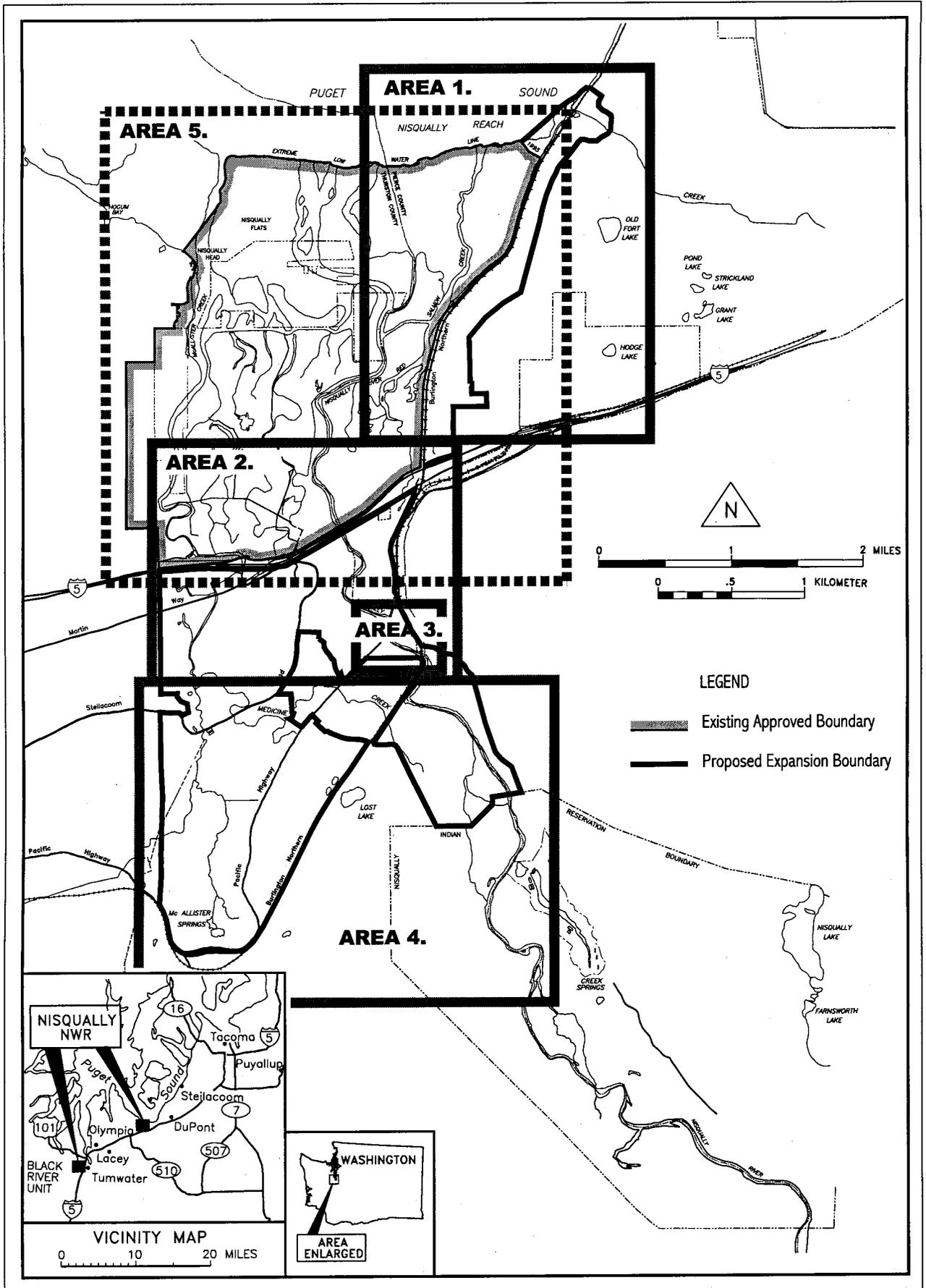
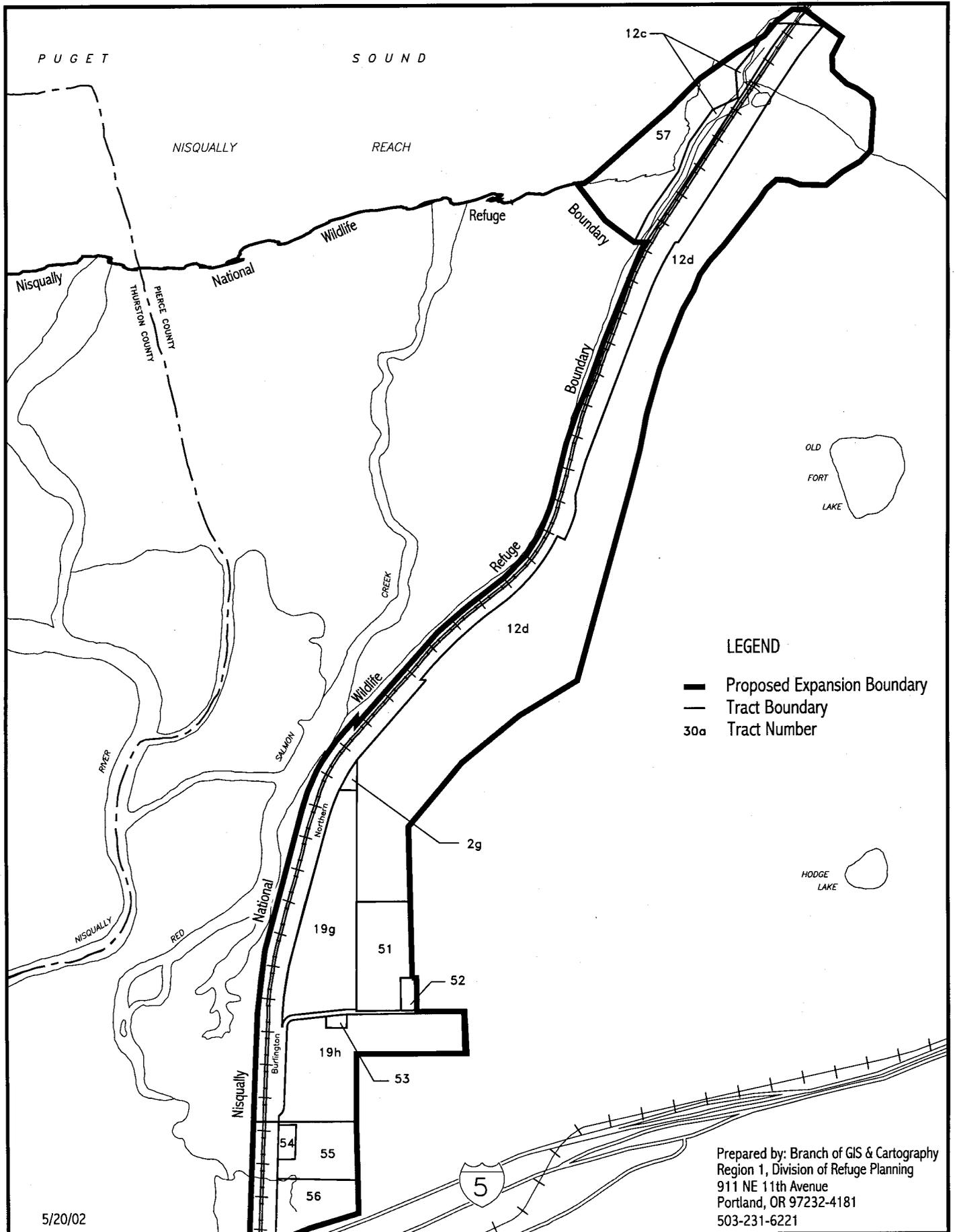


FIGURE 1. NISQUALLY NATIONAL WILDLIFE REFUGE TRACT MAP INDEX



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 911 NE 11th Avenue
 Portland, OR 97232-4181
 503-231-6221

FIGURE 2. AREA 1. TRACT MAP

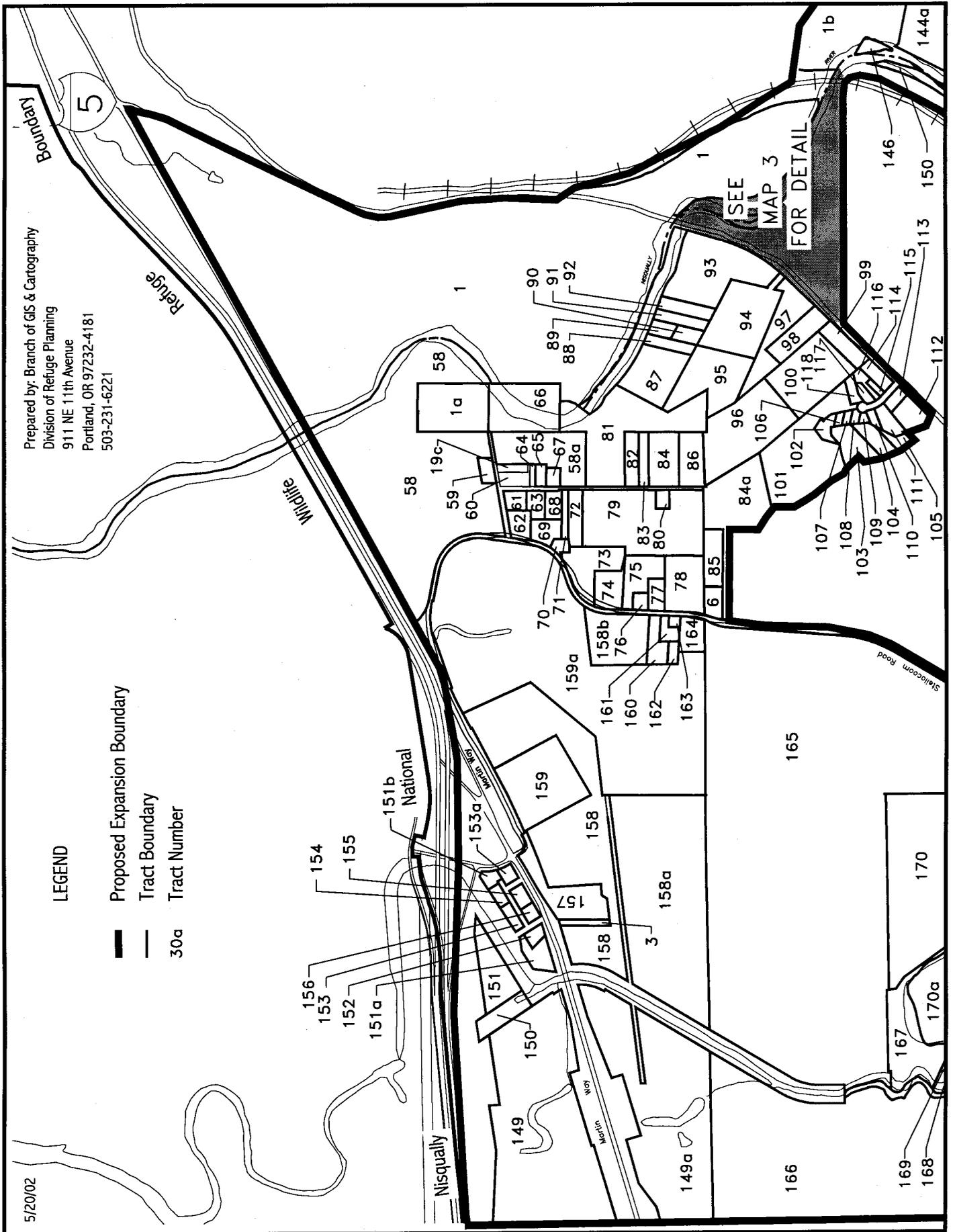
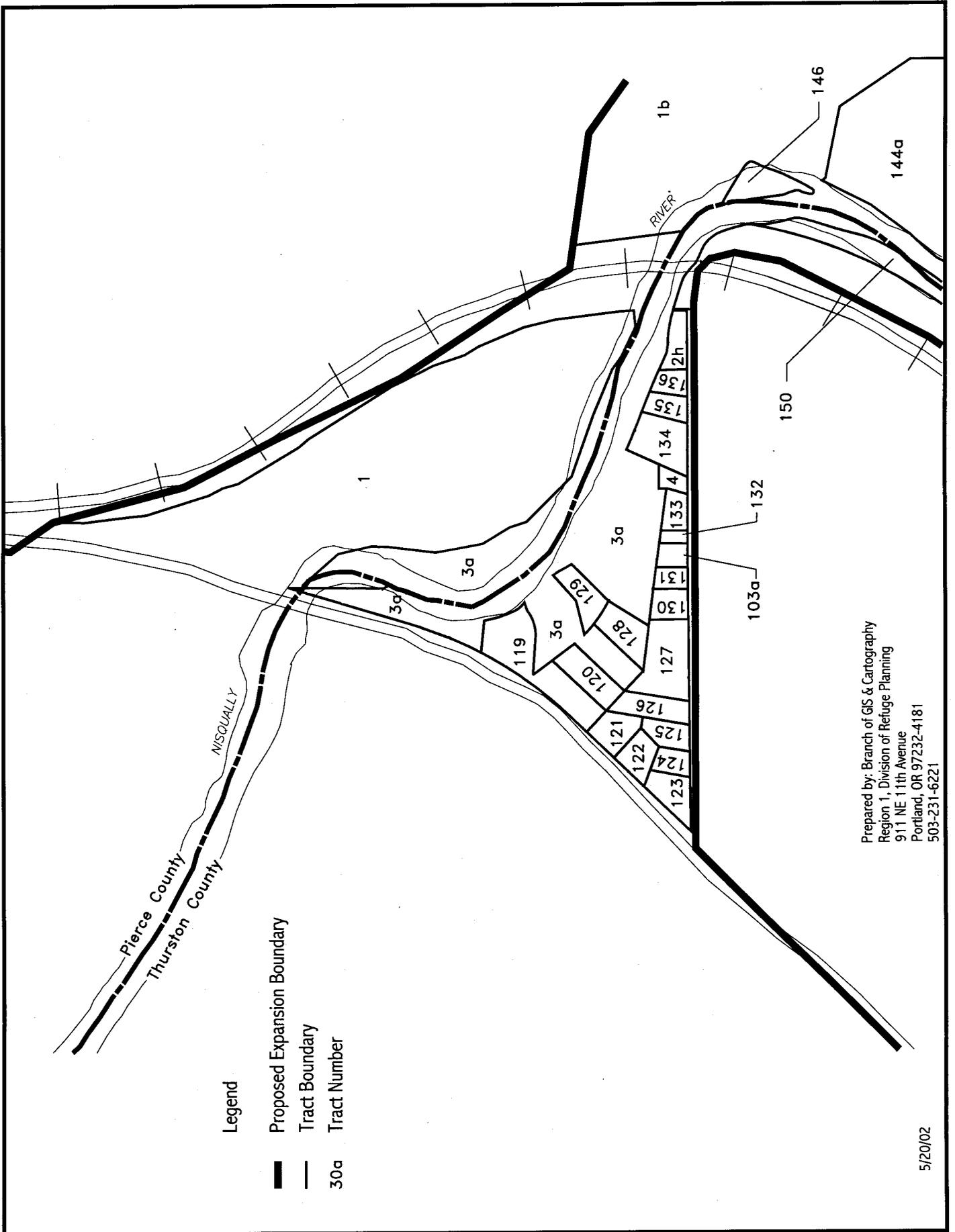


FIGURE 3. AREA 2. TRACT MAP



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FIGURE 4. AREA 3. TRACT MAP

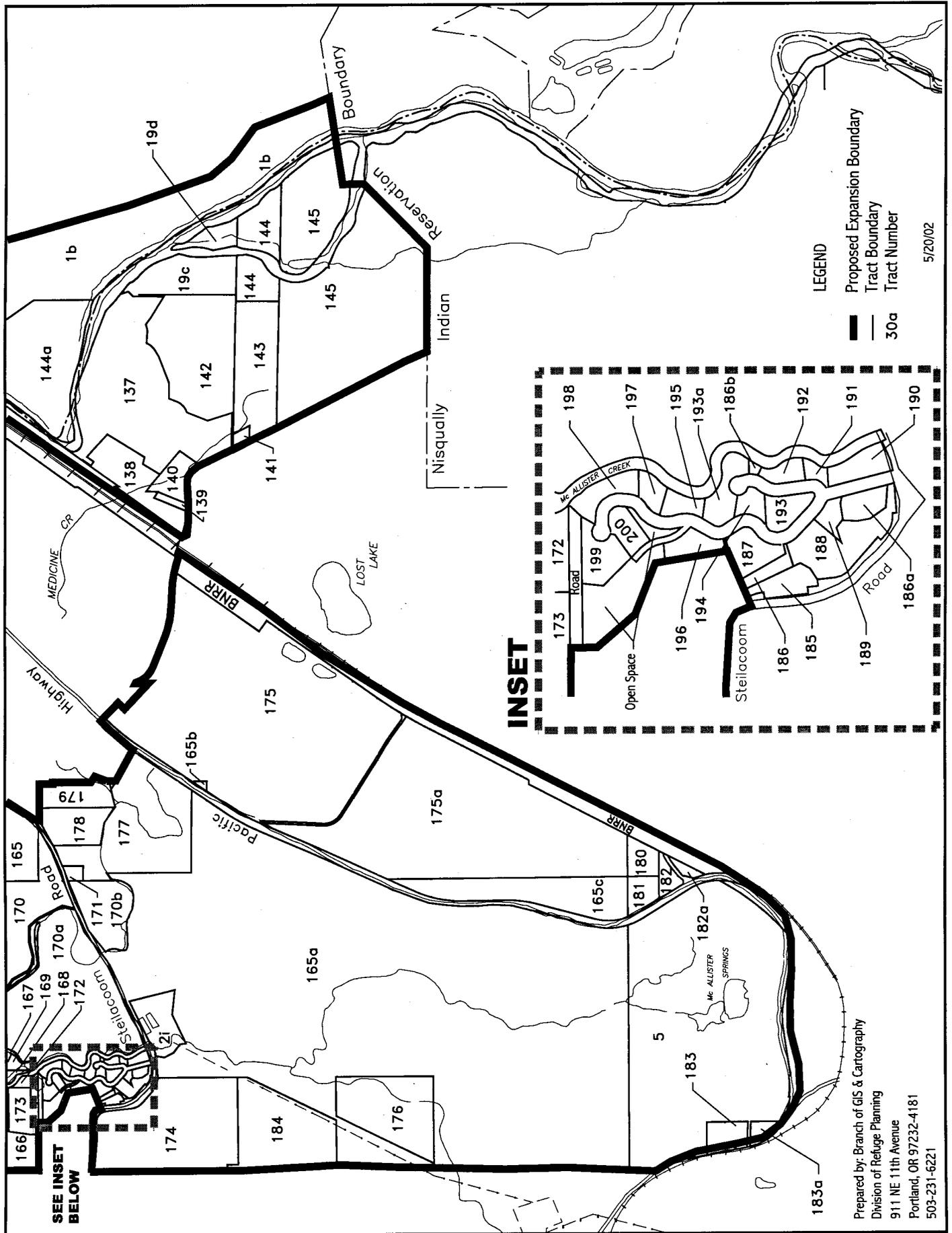
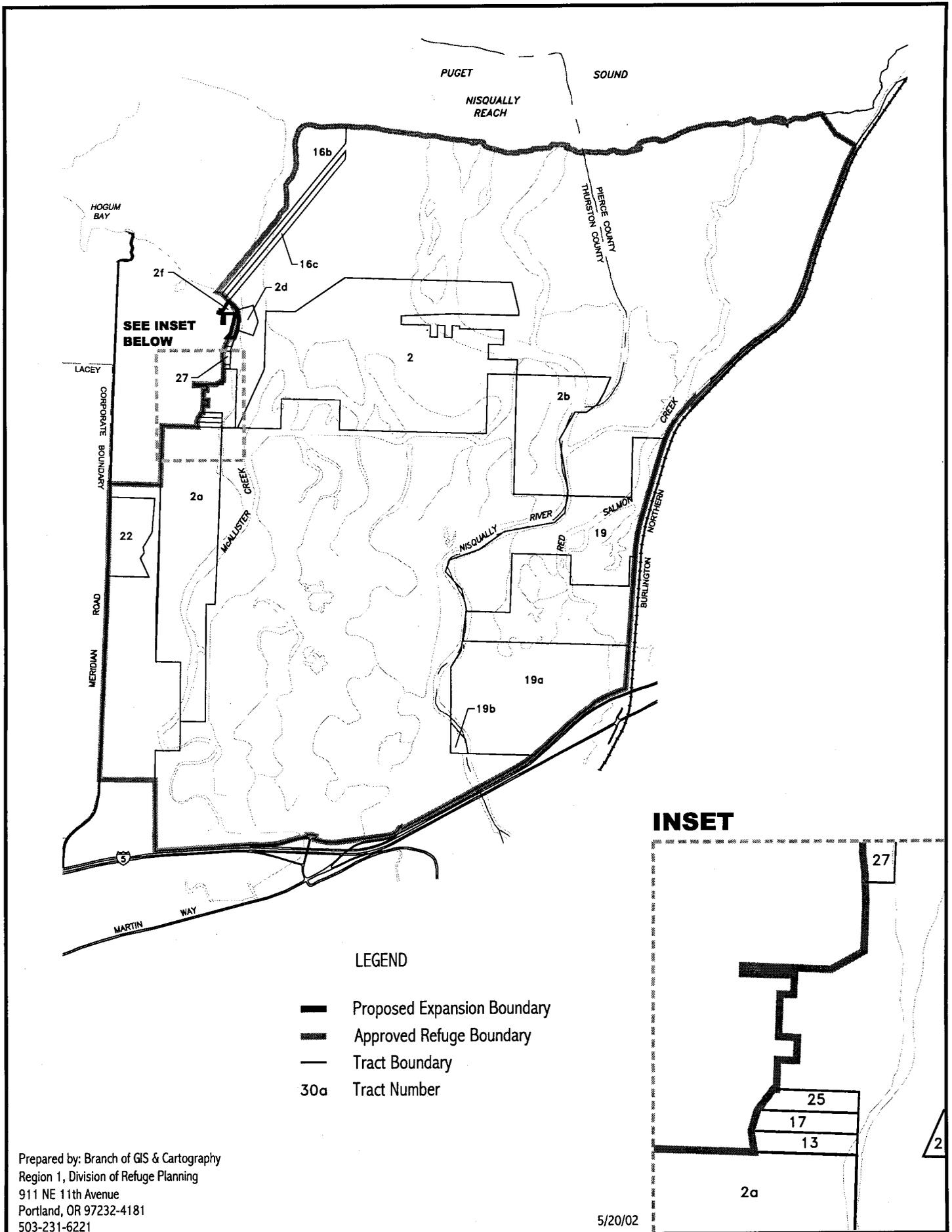


FIGURE 5. AREA 4. TRACT MAP

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FIGURE 6. AREA 5. TRACT MAP

Appendix L

Wilderness Review

Appendix L: Wilderness Review

A wilderness review is the process used by the Service to determine whether or not to recommend lands or waters in the National Wildlife Refuge System to Congress for designation as wilderness. The Service is required to conduct a wilderness review for each refuge as part of the CCP process. Land or waters that meet the minimum criteria for wilderness are identified in a CCP and further evaluated to determine whether they merit recommendation for inclusion in the Wilderness System.

According to Section 13 of the Service's Director's Order No. 125 (12 July 2000), in order for a refuge to be considered for wilderness designation, all or part of the refuge must:

- Be affected primarily by the forces of nature, with the human imprint substantially unnoticeable;
- Have outstanding opportunities for solitude or primitive and unconfined type of recreation;
- Have at least 5,000 contiguous acres (2000 ha) or be sufficient in size to make practical its preservation and use in an unimpaired condition, or be capable of restoration to wilderness character through appropriate management, at the time of review; and
- Be a roadless island.

Nisqually National Wildlife Refuge (Refuge) is not recommended for inclusion in the Wilderness System because it does not meet the above criteria. The Refuge comprises only 3,936 acres; has considerable evidence of past human use; does not have outstanding opportunities for solitude; and is not roadless.

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